



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



3 2044 004 641 676

* 13

**HARVARD COLLEGE
LIBRARY**



**FROM THE LIBRARY OF
NORTON PERKINS**

CLASS OF 1898



Documents

Relating to

THE PURCHASE & EXPLORATION

OF

LOUISIANA

DOCUMENTS
RELATING TO
THE PURCHASE
&
EXPLORATION OF
Louisiana.

- I. The Limits and Bounds of *Louisiana*. By THOMAS JEFFERSON.
 - II. The Exploration of the *Red*, the *Black*, and the *Washita* Rivers. By WILLIAM DUNBAR.
-

Printed from the original Manuscripts in the Library of the *American Philosophical Society* and by direction of the Society's Committee on Historical Documents.

BOSTON and NEW YORK: Published by
HOUGHTON, MIFFLIN & COMPANY. 1904.

LS 4784.18

13

*

HARVARD COLLEGE LIBRARY
FROM THE LIBRARY OF
NORTON PERKINS
NOVEMBER 11, 1929

COPYRIGHT 1904
BY THE AMERICAN PHILOSOPHICAL SOCIETY HELD AT PHILADELPHIA
FOR PROMOTING USEFUL KNOWLEDGE
ALL RIGHTS RESERVED

Published June 1904

FIVE HUNDRED AND FIFTY COPIES PRINTED

NUMBER 466

PUBLISHERS' NOTE.

THE two documents now first printed in this volume have been for nearly a century in the custody of the American Philosophical Society. The first is a paper written by Thomas Jefferson while President of the United States, which gives a summary of the various claims of France, Spain, and England to territory in the Mississippi Valley, and lays down the boundaries of the Louisiana Purchase. The original of this paper, in Mr. Jefferson's own hand, was deposited by him in the archives of the Society in Philadelphia, where it still remains. The second is the manuscript known to historians as the Dunbar Journal, the importance of which has been generally recognized, though but few have had access to it. The Journal was kept by William Dunbar of Natchez, on a voyage of exploration which, in company with Dr. George Hunter, he undertook by direction of the President in 1804, as a part of Mr. Jefferson's statesmanlike plan to survey the vast new territory just coming into the possession of the United States. This manuscript was presented to the Society by Daniel Parker, Adjutant and Inspector-General, U. S. A., on the 18th of July, 1817.

The Journal of William Dunbar is comparable to the more famous Lewis and Clark Journals, which were likewise placed in the keeping of the American Philosophical Society at the instance of Mr. Jefferson, and like them is a contribution of the first

order to the history of the earliest exploration of the country west of the Mississippi. Dunbar himself was a man of note, and has already been honored in his native state as "the first scientist of Mississippi." Born at Thunderton near Elgin, Scotland, a younger son of Sir Archibald Dunbar, he united, as so many eminent men among his countrymen have done, practical and scientific abilities of a high order. He settled in America in 1771, and became a successful planter. Later he held important trusts under the Federal government, was a correspondent of Thomas Jefferson, Sir William Herschel, David Rittenhouse, and other famous men, and made many contributions of importance to the scientific interests of the country, then in their infancy.

In addition to the Journal and the paper already mentioned on the boundaries of Louisiana, the volume includes the letter from Mr. Jefferson transmitting his manuscript to the American Philosophical Society, with some mention of the circumstances under which it was written, and an extract from Mr. Jefferson's message to Congress, transmitting a summary of the Dunbar Journal. The portrait of Mr. Jefferson is from the original by Thomas Sully, which now hangs in the rooms of the American Philosophical Society in Philadelphia. That of Mr. Dunbar is from the portrait at "The Forest," Dunbar's estate in Mississippi. The map is a photo-lithograph from the copper-plate engraving of Nicholas King's great map in the War Department at Washington.

In printing these rare documents, care has been taken to preserve the peculiarities of spelling and the quaint abbreviations which were characteristic of the writing of the time.

The acknowledgments of the publishers are due to the American Philosophical Society for its courtesy in permitting the use of the manuscripts here printed, and also of the portrait of Jefferson by Sully; to the Secretary of the Society, Dr. I. Minis Hays, for his assiduous care in the difficult task of comparing proof, verifying names, etc.; and to Mr. William Dunbar Jenkins for the copy which he has kindly furnished of the portrait of Dunbar.

Boston, May 9, 1904.



Th Jefferson



The
LIMITS
and
BOUNDS
OF
Louisiana

By THOMAS JEFFERSON





TO *PETER S. DU PONCEAU,*

Corresponding Secretary of the Literary and
Historical Committee of the American
Philosophical Society.

Monticello, Dec. 30, '17.

DEAR SIR

* * * * *

I NOW send you the remains of my Indian vocabularies, some of which are perfect. I send with them the fragments of my digest of them, which were gathered up on the banks of the river where they had been strewed by the plunderers of the trunk in which they were. These will merely shew the arrangement I had given the vocabularies, according to their affinities & degrees of resemblance or dissimilitude. If you can recover Cap^t Lewis's collection, they will make an important addition, for there was no part of his instructions which he executed more fully or carefully, never meeting with a single Indian of a new tribe, without making his vocabulary the 1st object. What Professor Adelung mentions of the Empress Catherine's having procured many vo-

cabularies of our Indians, is correct. She applied to M. de la Fayette, who, thro' the aid of Genl. Washington, obtained several: but I never learnt of what particular tribes. The great works of Pallas being rare I will mention that there are two editions of it the one in 2. vols, the other in 4. vols 4^{to} in the library I ceded to Congress, which may be consulted. But the Professor's acc^t. of the supposed Mexican MS. is quite erroneous, nor can I conceive thro' whom he can have recieved his information. It has probably been founded on an imperfect knolege of the following fact. Soon after the acquisition of Louisiana, Gov^r. Claiborne found, in a private family there, a MS. journal kept (I forget by whom) but by a confidential officer of the French government, proving exactly by what connivance between the agents of the Compagnie d'Occident, & the Spaniards, these last smuggled settlements into Louisiana, as far as Assinaïs, Adaïs etc. for the purpose of covering the contraband trade of the company. Claiborne being afraid to trust the original by mail, without keeping a copy, sent it on after being copied. It arrived safe and was deposited by me in the office of state. He then sent me the copy. On the destruction of the office at Washington by the British, apprehending the original might be involved in that destruction, I sent the copy to Col^o Monroe, then Secretary of State, with a request to return it, if the original was safe, & to keep it, if not. I have heard no more of it. My intention was, & is, if it is returned to me, to deposit it with your Committee, for

safe keeping or publication. While on the subject of Louisiana, I have thought I had better commit to you also an historical Memoir of my own respecting the important question of it's limits. When we first made the purchase, we knew little of it's extent, having never before been interested to enquire into it. Possessing then in my library every thing respecting America which I had been able to collect by unremitting researches, during my residence in Europe particularly, and generally thro' my life, I availed myself of the leisure of my succeeding autumnal recess from Washington, to bring together every thing which my collection furnished on the subject of it's boundary. The result was the Memoire I now send you, copies of which were furnished to our Ministers at Paris and Madrid, for their information as to the extent of territory claimed under our purchase. The New Orleans MS. afterwards discovered, furnished some valuable supplementary proofs of title.

I defer writing to the Secretary at war respecting the observations of Longitude & Latitude by Cap^t. Lewis, until I learn from you whether they are recovered, and whether they are so compleat as to be susceptible of satisfactory calculation. I salute you with great esteem and respect.

TH: JEFFERSON



A Chronological Series of facts relative to **Louisiana.**

1673. **S**PAIN declares war against France.
4. Russel's Mod. Eur. 68.

Joliet, an inhabitant of Quebec, & the
Jesuit Marquette descended from Can-
ada down the Missisipi to the Arkan-
sas in 33°. & returned to Canada. 8.
Rayn. 158. Hennepin N. D. 293.

1675. LaSalle goes to France to solicit au-
thority to explore the Mišipi. Joutel
xvii.

1678. The peace of Nimezuen. 4. Russ. 92.
LaSalle returned from France to Canada
with Tonti to undertake to explore
the Mišipi. Joutel xviii.

1679. He builds a fort at the mouth of the
Miami of the lake. Hennepin Nouv.
Decouvertes. 171.

1680. Jan. He builds a fort on the river Illi-
nois. Hennep. N. D. 223. Called it
Crevecoeur.

Feb. 29. Hennepin with 2. men leave
the Illinois to descend the Mišipi in a

bark canoe. Hennep. N.D. 228. 241.
Visits the Arcansas 258. The Taensas
263. Reaches the sea. 272. Returns to
the Illinois 294. 349. *Nouv. voyage*
96. 1. Du Pratz. 4.

1681. La Salle visits fort Crevecoeur & leaves
a garrison there of 15. or 16. men.
Tonti. 147.

1682. La Salle & Tonti went down the Mišipi
& named the country Louisiana. He
went to the mouths of the Mišipi, ob-
served their latitude, & returned to
Canada. Joutel xvii. xx. Tonti 153. 1.
Du Pratz 5. 2. Dumont 258. says in
1679.

They build a fort, called Prudhomme,
in the Chickasaw country 60. leagues
below Ohio.

1683. Tonti 155. Reach the ocean Apr. 7.
1683. Ib. 191. They have 60. persons
in their company. Set out on their re-
turn Apr. 11. 1683. Ib. 196.

Soon after this some Canadians, enticed by
the flattering accounts of the country,
went & settled near the mouth of the
Mišipi, & on the coast. 2. Dum. 260.

1684. Spain declares war against France, but
concludes at Ratisbon a truce of 20.
years. 4. Rus. 141.

Jul. 24. La Salle sails from Rochelle with 4. vessels to seek the mouth of the Miſipi by sea. Joutel 2. Tonti 140. He had with him 100. souldiers & officers, in all 280. persons. Hennepin Nouveau Voyage. 12.

1685. Feb. 18. La Sale landed in the bay of St Bernard, or St Louis. Joutel 32. 1. Dupratz 6. Tonti 245. 2. Dum. 259 Builds a fort there. Tonti 245. 276. Left 100. men there Hen. N.V. 23. 130. persons. Joutel 45.

Apr. 22. He sets out with 20. men to seek a new place. Tonti. 249.

June. He makes a 2^d settlement further up the river. 70. persons go to it. Joutel 49.

July. They abandon the first fort & go to the 2^d. Joutel. 51. Called it and the neighboring bay St Louis. Joutel 54.

Tonti descends the Miſipi with 40. men to meet LaSale. Tonti 220. reconnoitres the coast 20. leagues East and West of the mouth. On the jour de Paques (Easter) they set out on their return. 222.

Tonti builds a house on the river Arkansa & leaves 10. Frenchmen there. Tonti 225. Joutel says 6. men, 4 of whom

afterwards returned to Canada. Joutel 151. This becomes permanent. 226. 1. Dupr. 6. and is afterwards included in Law's grant, who settled it with Germans in 1719. 2 Dum. 68.

1686. Apr. 22. LaSale sets out for Illinois by land. Hennepin N.V. 39. but returns to Fort Louis. Ib. 63.

1687. Jan. 7. He sets out again with 20 men. Henn. N.V. 67. Is murdered. Joutel 99. Henn. N.V. 77.

LaSale's 2^d fort at St. Louis is afterwards abandoned. Tonti 329. Coxe. 39.

After the death of LaSale, Cavelier his brother, with 7. men, set out for Canada. Joutel 132.

July. They find the house on the Arkansa built by Tonti with only 2. men remaining in it. Jout. 151. They leave one of their company there. 157. They strike the Miſipi. Joutel 158.

Dec. 3. Tonti sets out from the Illinois, & descends the Miſipi a 2^d time. Tonti. 317. Finds LaSale's 2^d settlement broke up. 329. Finds at the Coroas 2. of the 7. French men who had separated from Cavelier after the death of LaSale. 331. Returns to Illinois. 331.

- 1689. War commenced by Spain against France.
4. Russel. 228.
- 1696. Spain established a post at Pensacola. 9.
Reynal. 128.
- 1697. Sep. 20. Treaty of Ryswick 4. Russell
248.
- 1698. D'Hiberville discovers the mouth of the
Miſſipi. by sea. 2. Dum. 260.
He is made Governor. 2. Dum. 260.
He establishes a colony at Mobile, &
Isle Dauphine. 260.
- 1701. The war of the Spanish succession begins,
France & Spain being allies. 4. Rus.
317.
- 1712. Sep. 14. Louis XIV. grants the exclusive
commerce of Louisiana to Crozat.
Possession & extent described Joutel
196. 2. Dum. 260.
- 1713. Mar. 31. Treaty of Utrecht establishing
the 49th degree of lat. as the division
between Louisiana & the British
Northern possessions.
- 1714. Mar. 6. Treaty of Rastadt.
- 1715. The French establish Natchitoches on
Red river & build a fort 35. leagues
above it's mouth. 2. Dum. 65.
- 1715. The Spaniards make settlements at the
Assinais & Adais on one side & at Pen-

- sacola on the other. 1. Dupratz 9. 13.
14. (this was 7. or 10. leagues from
Natchitoches) to restrict the French
limits. 1. Dupratz. 14. 278.
1716. Crozat cedes his charter to the West
India company. 2. Dumont. 6. 260.
1717. The company sent inhabitants to Isle
Dauphine, where were some settlers
before. 2. Dum. 7.
Hubert and Page settle at the Natchez.
2. Dum. 60.
Fort Rosalie is built. 2. Dum. 60.
1718. Two other vessels are sent there. 2.
Dum. 8.
France and England declare war against
Spain. Quadruple alliance. 5. Rus. 6.
1719. The French take Pensacola. 1. DuPratz
189. 2. Dumont 9. The Spaniards re-
take it. 191. 12. The French take it
again. ib. 195. 18.
France and Spain make peace. 5. Rus. 7.
France sends 800. settlers to Louisiana.
DuPratz. xlviii.
Old Biloxi is settled. 2. Dumont 34.
Isle Dauphine is evacuated & every body
removed to Old Biloxi, except a Ser-
jeant & guard of 10. men. 2. Dum.
36. 37.

New Biloxi is settled. 2. Dum. 42. 43.

A cargo of Negroes arrives at Old Biloxi.
ib.

The grantees now settle, every one on his own grant, to wit, at Old Biloxi, Bayagoulas, Point Coupée, Natchez, Yazous, Arkansas, Black river. 2. Dum. 44.

New Orleans is laid off, 30 leagues above the mouth of Miſipi, where some settlers from Canada had already settled, & the seat of government is fixed there. 2. Dum. 47.

1720. A fort on the Missouri is built & garrisoned. 2. Dum. 74. Called Fort Orleans. Jeffry. 139.

DelaHarpe & Dumont, with 22. men, go 300. leagues up the Arkansa. A fine country. Salt springs, marble, plaster, slate & gold. 2. Dum. 70.

1722. The Balise is established, & a fort built on piles. 2. Dum. 57.

The Spaniards attempt a settlement among the Missouris, but are all massacred to the number of 1500. 2. Dum. 282.

1733. France, Spain & Sardinia commence war against the Emperor. 5. Rus. 27.

1735. Peace is made 5. Rus. 29.

1736. The French build a fort at Tombicbee.
1. DuPratz. 85.
1743. The Family compact made.
1748. The Treaty of Aix la Chapelle. 5. Rus.
187.
1762. Spain enters as an ally with France into
the war against England.
- Nov. 3. France cedes Louisiana West of
Iberville to Spain by a secret treaty,
and East of Iberville to England. Pre-
liminary treaty. The King of France's
order to L'Abbadie.
1763. The Treaty of Paris is made.
1783. Great Britain cedes the two Floridas to
Spain.



Limits.

IN 1680. the nearest settlements of Spain were
on the river Panuco, 100. leagues West of
the Mišipi. Hennep. N.D. 274. Coxe 115.
Coxe's Carolana. 4.

In 1715. they make the settlements at Assinais
& Adais, & Pensacola. 1. DuPratz. 9. 13.
14. 278.

In 1722. they attempt one on the Missouri

which is prevented by the Indians. 2. DuPratz 157. 2. Dumont 282. Jeffry's hist. of the French Dominions in America. 139.

DuPratz sais 'the coast is bounded to the West by St Bernard's bay, where M. de la Salle landed.' and again 'on the East the coast is bounded by Rio Perdido etc. a little to the East of Mobile etc. 1. DuPratz. 216. and 'the Red river bounds the country to the North.' 1. DuPratz. 272.

2. DuPratz 301. says 'Canada lies to the North of Ohio, & inclines more to the East than the source of Ohio.' [Consequently the Ohio was not in Canada, and must therefore have been in Louisiana, as these two provinces were co-terminous.] And again 'the lands of the Illinois are reputed to be a part of Louisiana.' Ib. His book was published in 1758. and the translation in 1763.

The Translator of DuPratz, in his preface, says 'the mountains of New Mexico run in a chain of continued ridges from North to South, and are reckoned to divide that country from Louisiana, about 900. miles West from the Miſipi. Pa. xi.'

1712. The great document establishing with precision the boundaries of Louisiana, is Louis XIV's grant of this date to Crozat. to be found in the translation of Joutel. 196.

1763. Treaty of Paris Art. VI. France cedes to England the river & port of Mobile & every thing on the left side of the Miſipi, which she possesses or ought to possess except the island of N. Orleans: and Art. XIX. Spain cedes to England all she possesses East or S. E. of the Miſipi. Thus all Louisiana E. of the Miſipi. is acknowledged to England, and all English claims West of the Miſipi acknowledged to Spain.

England divides the country South of Georgia, & East of the Iberville into two provinces, East & West Florida, by the Apalachicola.

1783. England, by Art. V. of the treaty cedes to Spain la Floride Orientale ainsi que la Floride Occidentale.

Spain re-establishes the government of Louisiana as before, & the government of Florida; that part of what the English had called West Florida being under the Governor of N. Orleans, & the rest under the Governor of Florida. See the Baltimore American Patriot. Vol. 1. N^o 97. This is confirmed by M. D'Azara, Spanish Ambassador at Paris who told m^r Livingston that Mobile made a part of Louisiana. See Liv's letter to Monroe. Paris. May 23. 1803.

Spain retrocedes to France by the treaty of St. Ildefonso.

1803. Apr. 30. France cedes to the US. Louisiana with the same extent that it now has, & that it had when France possessed it, and such as it ought to be after treaties passed subsequently between Spain & other powers.

‘Objections des Commissaires Anglois sur l’incertitude des limites de l’Acadie etc. ‘Les limites propres et anciennes de l’Acadie s’étendent depuis l’extrémité de la baye Françoisse jusqu’au cap Canseau. L’objection d’incertitude sur ces limites ne peut donc tomber que sur celles de l’intérieur des terres. Dans de pareils cas, la règle la plus usitée et la plus convenable est d’étendre les limites dans l’intérieur des terres jusque à la source des rivières qui se déchargent à la côte, c’est à dire que chaque nation a de son côté les eaux pendantes. C’est ainsi qu’on en a usé à la paix des Pyrénées pour fixer les limites entre la France et l’Espagne’ etc.
1. Memoires de l’Amerique. 116.



A N

Examination

I N T O

The boundaries of *Louisiana*.

THE French having for a century and a half been in possession of Canada, and it's inhabitants penetrating to the remote waters communicating with the St. Laurence, they learned of the Indians that, in the neighborhood of those waters, arose a great river, called the Missisipi, running due South to the sea, and through a fine country unpossessed by any white nation. In 1673. the Sieurs Joliet and Marquette, two Canadians, undertook to explore it, descended the Missisipi as far as the river Arkansa, in 33° & returned to Canada. Their account of it inflamed the enterprize of M. de la Salle, who in 1675, went to France to solicit authority to explore the Missisipi. He obtained it, returned to Canada, and in 1680. went as far as the river Illinois, on the

lower part of which he built & garrisoned a fort called Crevecoeur, and sent the father Hennepin with 2. men to push his discoveries down the Miſipi as far as he could ; &, as preparatory to a more formal essay, going himself Northwardly. Hennepin descended the Miſipi to the ocean, & returned with the information collected, to the Illinois. In 1682. La Sale & Tonti undertook their expedition ; went down the river with 60. men, named the country Louisiana, built a fort in the Chickasaw country, 60 leagues below the Ohio, which they called Prudhomme, reached the ocean, and returned to Canada the ensuing year 1683.

La Sale then went to France, to obtain the means of going thence to the Miſipi directly by sea. In the mean time some Canadians descend the river, & settle near it's mouth, & along the coast Eastwardly, to the island of Massacre, opposite Mobile. The government of France, entering at once into the view of extending an united possession along the S^t Laurence & Miſipi, from sea to sea equips la Sale with 4. vessels, on board of which were 280. persons, of whom 100. were officers and soldiers furnished with all necessaries. He sailed in July 1684. from Rochelle, and missing the mouth of the Mississippi, landed Feb. 18. 1685. in the Bay of S^t Bernard to the West of it. Here he takes possession, makes two successive establishments, building and garrisoning

forts at each, the second of which was called St. Louis.

The Chevalier Tonti, about this time, sets out from Canada in quest of La Sale, whom he supposed to be then on the Misipi, descends with 40. men to the mouth of the river, reconnoitres the coast 20. leagues East & West; finding nothing of La Sale, he ascends the river, builds a house on the river Arkansa, and leaves 10. men in it, which becomes a permanent settlement, and he returns to Canada.

In 1686 La Sale attempts to penetrate from fort St. Louis to the Illinois by land, but is obliged to return. In 1687 he makes another attempt with 17. men, and is murdered on the way by some of his own people. Cavelier, brother of La Sale, undertakes the same enterprize with 7. men; they find the house on the Arkansa built by Tonti, with only two men remaining in it; they leave a third, strike the Misipi, and reach Canada. Tonti descends the river a second time, finds two Frenchmen who had separated from Cavelier settled at the Coroas, and returns to the Illinois.

In 1689. a war commenced between France and Spain, which continuing till the treaty of Ryswick in 1697. suspended the aids of France to her colony: but in 1698. D'Iberville was sent as it's governor with recruits. He discovers the mouths of the Misipi, and settles his new recruits

at Isle Massacre, which he calls Isle Dauphine, and at Mobile, where they find the Canadians who had settled there in 1683. Spain had, during the war, to wit, in 1696. taken a counter-post at Pensacola.

The result from these facts is that France had formal & actual possession of the coast from Mobile to the bay of St Bernard, & from the mouth of the Miſipi up into the country as far as the river Illinois. The nearest Spanish settlements at this time were on the River Panuco, to the West, 100. leagues from the Miſipi, and at Pensacola, to the East . . leagues distant. There does not appear as yet indeed to have been any formal declaration of the limits of Louisiana: but the practice of nations, on making discoveries in America, has sanctioned a principle that 'when a nation takes possession of any extent of sea-coast, that possession is understood as extending into the interior country to the sources of the rivers emptying within that coast, to all their branches, & the country they cover.' 1. Mem. de l'Amerique 116. It was in support of this principle of virtual and declared possession, that France entered into the war of 1755 against Great Britain, whose settlements began now to reach the Eastern waters of the Miſipi, and who opposed the claim of France, not on a denial of this principle, but on a prior possession taken & declared by repeated charters, thro' the space

of an hundred years preceding, as extending from sea to sea. France then had possession of the Misipi, and all the waters running into it, and of the sea coast and all it's rivers & territories on them from Mobile to the bay of S^t Bernard. The river Perdido, midway between the adversary possessions of Mobile & Pensacola, became afterwards the settled boundary between Spain & France, in the East, and the Rio Norte, or Bravo, midway between the bay of S^t Bernard and the river Panuco, the then nearest settlement of Spain, was considered by France, if not by Spain, and on the same fair grounds as in the other quarter, as the boundary between them in the West. Besides being midway between the actual possessions of the two nations, that river formed a natural and well marked boundary, extending very far into the country Northwardly. And accordingly we find by several * maps, some of them published by authority of the French government, and some Spanish maps, that France claimed to that river. This claim has not been abridged, as far as is known,

* I possess three antient maps which mark the Rio bravo & it's Eastern branch as the dividing boundary between Louisiana & Mexico. 1. Moll's map of the West Indies & adjacent countries. 2. Moll's map of Louisiana etc. published in 1720. in which the South Western parts of Louisiana are said to be copied from a French map published in Paris in 1718. and 3. Homann's Spanish map of Louisiana of about the same date.

by any public treaty ; and those which are secret, if any such have taken place, cannot bind nations having no notice of them, & succeeding fairly to the rights of France, as publicly avowed & believed to exist.*

But the extent of Louisiana into the interior country is not left merely on the principle of it's dependency on the coast into which it's waters disembogue : nor on the settlements extending up it's great rivers, the Miſipi, the Missouri, & the Illinois; but on an authoritative and public document announcing it's extent, and making a temporary disposition of it. This is the Letter patent of Sep. 14. 1712. by which Louis XIV. grants to the Sieur Anthony Crozat the exclusive commerce of that country for 15. years. The following extracts from it ascertain the extent of the country.

‘ Louis by the grace of god, king of France & Navarre to all etc.

‘ The care we have always had to procure the welfare & advantage of our subjects having induced us etc. to seek for all possible opportunities of enlarging & extending the trade of our American colonies, we did, in the year 1683. give our orders to undertake a discovery of the countries & lands which are situated in the Northern part of America, between

* To this may be added the verbal declaration of the French Comm^r to those of the US. on the delivery of possession, that his positive instructions from his government were to take possession to the Rio Bravo.

New France & New Mexico : & the Sieur de la Sale, to whom we committed that enterprize, having had success enough to confirm a belief that a communication might be settled from *New France to the gulph of Mexico*, by means of large rivers ; this obliged us, immediately after the peace of Ryswick, to give orders for the establishing a colony there, & maintaining a garrison, *which has kept and preserved the possession we had taken in the very year 1683.* of the lands, coasts & islands which are situated in the gulph of Mexico, between Carolina on the East, & Old & New Mexico on the West. But a new war having broke out in Europe shortly after, there was no possibility till now, of reaping from that new colony the advantages that might have been expected from thence etc. And whereas upon the information we have received, concerning the disposition and situation of the *said countries known at present by the name of the province of Louisiana*, we are of opinion that there may be established therein a considerable commerce etc. we have resolved to grant the commerce of the country of Louisiana to the Sieur Anthony Crozat etc. For these reasons etc. we, by these presents, signed by our hand, have appointed, & do appoint the said Sieur Crozat to carry on a trade in all the lands possessed by us, and bounded by New Mexico, & by the lands of the English of Carolina, all the establishment, ports, havens, rivers, & principally the port & haven of the Isle Dauphine, heretofore called Massacre, the river of *S. Louis*, heretofore called *Missisipi*, from the edge of the sea as far as the * Illinois ; together with the river *S. Philip*, heretofore called the *Missourys*, and

* The French & Spaniards called by the name of *the Illinois*, or Illinois country, the whole country on both sides

of S^t Jerome, heretofore called Ouabache, with all the countries, territories, lakes within land, and the rivers which fall directly or indirectly into that part of the river S^t Louis.'

THE ARTICLES. I. Our pleasure is that all the aforesaid *lands, countries, streams, rivers & islands* be, and remain *comprised under the name of the government of Louisiana*, which shall be dependant upon the general government of New France, to which it is subordinate: & further that all the lands which we possess from the Illinois be united etc. to the general government of New France, & become part thereof etc.' [here follow 15. other articles relating to commerce only] 'Given at Fontainebleau the 14th day of Sep. in the year of grace 1712 and of our reign the 70th Louis. By the king Phelipeaux.'

Here then is a solemn & public declaration sufficiently special to shew that all the waters running directly or indirectly into the Miſipi, and the country embraced by them, are held and acted on by France, under the name of the province of Louisiana; and is a full & unequivocal supplement, if any supplement were necessary, to the titles derived, 1. from the actual settlements on the river and it's waters, 2. from the possession of the coast, & 3. from the principle which annexes to it all the depending of the Upper Miſipi. That on the Eastern side was called East Illinois, that on the West side West Illinois.

waters. The treaties of Ryswick, in 1697, where France & Spain were adversary powers, & those of Utrecht in 1713. & Rastadt in 1714. where they were allies, by their silence, as well as by their provisions, as to these countries, must be considered as sanctioning the rights of France to this province: to which add the progress made by France, undisturbed & unquestioned, by Spain, in extending her settlements *ad libitum* within them, till 1763. It is true that in 1715. some Spaniards made small settlements at the Assinais, & Adais, & in 1722. attempted one on the Missouri. The last was prevented by the Indians, and the former were connived at by the Agents of France to favor a smuggling commerce with New Mexico. But these contraband encroachments cannot weigh as evidence of ownership against the possession taken by France 30. years before, & the solemn establishment of boundary by Louis XIV.

War breaking out between them in 1718. the French took Pensacola; the Spaniards retook it, but the French recovered & retained it till the peace in 1719 when it was restored to Spain; and from this epoch the river Perdido has been the acknowledged and undisturbed boundary between Louisiana and Florida.

The boundaries of Louisiana then, as held by France, were the sea-coast & islands from the river Perdido to the Rio Norte or Bravo,

then up the Rio Bravo to it's source ; thence to the highlands encompassing the waters of the Mišipi, and along those highlands round the heads of the Missouri & Mišipi & their waters to where those highlands assume the name of the Alleganey or Apalachian mountains, thence along those mountains, and the highlands encompassing the waters of the Mobile, to the source of the Perdido, & down that to the ocean.

In opposition to these claims, both of France and Spain, were those of the then English colonies, now the US. whose charters extended from sea to sea, and consequently covered all Louisiana & Mexico, above the parallel of latitude which formed the Southern boundary of Georgia. These adversary claims were settled by the war of 1755-1763. and the treaty of Paris which closed it, and which made the Mišipi & Iberville the Western limit of the English possessions, and thenceforward the Eastern limit of Louisiana.

This war had begun between France & England, Spain being unconcerned in the grounds of it. In the beginning, France had sensibly the advantage, but after awhile it's successes were signally on the side of England. In 1762 Spain entered into it as a volunteer & ally of France. Great Britain immediately attacked & took the town of Havanna, & an important portion of the

island of Cuba ; which imminently endangering the continental possessions of Spain within the gulf, and her communication with them, negotiations for peace were very soon set on foot. Great Britain, in exchange for her conquest in Cuba, required Florida, & that part of Louisiana from the Perdido to the Iberville. Besides the just sympathy which France felt for Spain, who had sustained this incalculable loss by friendly endeavors to aid her, she was bound by the family compact, lately renewed, Article XVIII. ‘ to consider the interests of Spain as her own, & to share in it’s losses and advantages.’ A considerable change too had taken place in the minds of the government of France, against the possession of distant colonies, which could not be protected but by a great navy. France therefore, by a secret treaty, Nov. 3. 1762. (being the same day on which they publicly signed the preliminary articles with Gr. Britain) consented to cede all Louisiana to Spain, in order to enable her, by the sacrifice of such part of it as she thought proper, to ransom Cuba, and to indemnify her for the loss of Florida, required also by Great Britain to make up the equivalent. The portion of Louisiana from Iberville to Perdido therefore, ceded to Great Britain by the definitive treaty of Feb. 10. 1763. did in substance move from Spain to Gr. Britain, altho’ France, as not having publicly conveyed

it to Spain, was the formal conveyor to England. Yet she acted herein merely as the friend & agent of Spain, who was become in truth the real proprietor of all Louisiana. The importance of seeing this transaction in it's true light will hereafter appear.

England immediately laid off this portion of Louisiana, with so much of Florida as laid West of the Apalachicola, into a separate government, to which she gave the name of West Florida; and the residue of Florida into another government, to which she gave the name of East Florida. And Spain, now proprietor of Louisiana, & of course free to curtail it's future boundary to the Westward, according to her own convenience, extended the limits & jurisdiction of New Mexico to the waters of the river Mexicana inclusively. But this cannot disprove the former extent of Louisiana, as it had been held & ceded by France; but was done in virtue of the right ceded by France.

The war of 1775-1783. began between Great Britain & the US. but France and Spain at length became parties to it. By the treaty of Paris of 1783. which terminated it, Gr. Britain was constrained to restore to Spain Florida, and the territory East of the Iberville, which she had received at the close of the former war in exchange for Cuba. If the portion of Louisiana comprised in it had really moved from

France, then the restitution of the portion between Iberville & Perdido should have been to France, and that of Florida only to Spain. But as the whole had moved substantially from Spain, the whole was restored to her. On re-entering into possession Aug. 18. 1769. she continued the English annexation of the Eastern portion of Louisiana with a part of Florida, under the name of West Florida; restoring however the whole to the jurisdiction of the Governor of Louisiana, residing at N. Orleans: and in public * instruments, as well as in common parlance that portion has been spoken of under the names of Louisiana, or of West Florida indifferently.

The nation of France had seen with considerable dissatisfaction the separation of Louisiana from the mother country. That province had ever been viewed by it with great partiality. It was inhabited by their relations & fellow citizens: & they considered Spain, in the immensity of her possessions, as not entitled to such a sacrifice from France. Besides she had now got back both Florida & Cuba: and there was no justice in her continuing to retain Louisiana, which had been ceded to her only as an indemnification for the loss of one, & the means of getting back the other. As soon therefore as the successful administration of the first Consul of

* One of these was deposited in the office of state.

France had raised her into a condition for redemanding from other nations what she deemed her rights, Spain was required to make restitution of Louisiana, under the friendly cover indeed of an exchange, but it's inequality shews it was but a cover. The real grounds of restitution required that it should not be mutilated, but full and entire as she received it. For what had she ever given for it? She was compleatly replaced in her antient possessions. On what just ground then could she propose to retain any portion of the equivalent ceded only as an indemnity for them? Accordingly a compleat retro-cession was provided for by the treaty of St. Ildefonso of Oct. 1. 1800. by definitions studiously formed to reach every thing which had been ceded to or for her by France. By that instrument she re-cedes to France the colony or province of Louisiana, with the same extent 1. that it now has in the hands of Spain. 2. that it had when France possessed it, and 3. such as it ought to be after the treaties passed subsequently between Spain and other powers. That is 1. she is to recede the antient country of Louisiana, as it is now recovered back into the hands of Spain & held by her under the name of Louisiana, or West Florida, or Mexico, or by whatever other names she or other powers may since have chosen to designate certain parts of it, or to sever it by overlapping Mexico on it's West, and West

Florida on it's Eastern quarter : she is to recede the *thing*, as it is in her hands, unaffected by new names. To make it still plainer, she is to retrocede it 2^dy with the same extent that it had when France possessed it. Now France never possessed it one day with any less extent than from the Perdido to the Rio Norte, & inland to the sources of all it's rivers. The whole of this extent she transferred on the same day by two treaties of equal date, to wit, all Westward of the Misipi & Iberville to Spain, & all Eastward to Great Britain. But, of the Eastern portion, Spain having since recovered back all below 31°. of latitude, that, with the Western side, composes Louisiana, as now in the hands of Spain, and as it had been possessed by France. But, not to disturb the right of the US. to the portion North of 31°. and to shew that it was only so much of the Louisiana held by France, as *was now in the hands of Spain*, it is expressly limited 3^dy to be such as it ought to be after the treaties passed *subsequently* between Spain & other powers. *Subsequently* to what ? To the cession of the country by France. When was that session ? Nov. 3. 1762. and Feb. 10. 1763. What are the treaties subsequent to this ? Those affecting the limits of Louisiana are the treaty of Sep. 3. 1783. with Great Britain, & that of Oct. 27. 1795. with the US. The former was a restitution, by Gr. Britain to Spain, of Florida,

& the portion of Louisiana from the Perdido to the Iberville : and consequently, *after this treaty*, the extent of Louisiana *ought to be*, as again consolidated to the Perdido. But inasmuch as by the latter of these two treaties, Spain had confirmed to the US. a degree of latitude [from 32°. to 31°.] which she had long contended to be an unceded part of Louisiana, & consequently not within the limits of the US., therefore by this provision, that right is saved to the US. & the extent of Eastern Louisiana, *after this treaty, ought to be* only to the latitude of 31°.

Should it be alledged that this confirmation of the diminutions of Louisiana by treaties subsequent to it's alienation by France, goes to the treaty of 1763. with Gr. Britain also ; the answer is that this treaty was *simultaneous* with the alienation, & not subsequent to it, and therefore could not be within the scope of this definition. The confirmation too is in favor of treaties made *by Spain*, with other nations. That with Great Britain is by *France and Spain*. But it might also be justly observed that Louisiana was not lessened in it's dimensions by that treaty ; it was only divided, the Eastern portion thereof transferred to Great Britain, the Western to Spain ; who might new-name a part of it West Florida, & a part Mexico, for their internal purposes, as they pleased ; but when the portion newly called

West Florida came back to *the hands of Spain*, it was still a part of antient Louisiana, *as possessed by France, as now in the hands of Spain*, & unalienated by subsequent treaties of Spain with other powers.

On the whole, the intention of the treaty of S^t Ildefonso is clearly this. France had in 1763. generously ceded all Louisiana to, or for Spain. Spain consented that the Eastern portion of it, below Georgia, together with her Florida, should go to recover Cuba. Afterwards however, in another war, by the arms of France and of the US. (for Spain came in late, & then did little more than waste her resources on the rock of Gibraltar) she recovers back, and has secured to her, her antient Florida, & the Eastern portion of Louisiana, below Georgia. The treaty of S^t Ildefonso therefore meant to review this whole transaction, & to restore France & Spain to the *Status quo* prior to the war of 1755.—63. Spain being now in possession of her original colonies of Florida and Cuba, it was just, & was meant, that France should also be reinstated in Louisiana, so far as Spain, while it was in her hands, had not transferred portions of it by permanent alienations to other powers. She confined her reclamation therefore to the part of her antient possession which was in the hands of Spain, not touching the portions which had been validly transferred to the US.

If Spain then were not to deliver the country from the Iberville & Missipi to the Perdido, this would not be delivering Louisiana with the extent it had when France possessed it, & before it had ever been dismembered: nor with the extent it *now* has in the hands of Spain, since it has been restored to it's antient & integral form: nor such as it ought to be after the treaty subsequently passed with England in 1783. And we trust that these definitions are too exact & unequivocal, & Spain too just, to admit any doubt of what we are entitled to demand, & she bound to deliver.

Whatever Louisiana was, as retroceded by Spain to France, such exactly it is, as ceded by France to the US. by the treaty of Paris of April 30. 1803.

Sept. 7, 1803

P. S. The Northern boundary of *Louisiana*, Coterminous with the possessions of *England*.

THE limits of Louisiana have been spoken of in the preceding statement, as if those established to the West & North, by the charter of Louis XIV. remained still unaltered. In the West they are so, as already explained. But, in

the North, a material change has taken place. With this however it was unnecessary to complicate our subject, while considering the interests of Spain alone: because the possessions of Great Britain, & not of Spain, are coterminous with Louisiana on it's Northern boundary. We will now therefore proceed to examine the state of that boundary, as between Gr. Britain & the US.

Disputes having arisen between Gr. Britain & France as to the limits between Canada & Louisiana on the one side, & the countries of the Hudson's bay, & North Western companies on the other, it was agreed by the treaty of Utrecht (1713) Art. X. that 'Commissaries should be forthwith named by each party to determine the limits between the bay of Hudson and the places appertaining to the French, & to describe & settle the boundaries between the other British and French colonies in those parts' these Commissaries accordingly fixed the Northern boundaries of Canada & Louisiana, by a line beginning on the Atlantic, at a Cape or Promontory in $58^{\circ}-30'$ N. Lat. thence South Westwardly to the lake Misgosink, or Mistasin, thence farther S. W. to the lat. of 49° North from the Equator, and along that line indefinitely. [Hutchins's topographical description of Louisiana. pa. 7.] Thus the Northern boundary of Canada and Louisiana became fixed, & the

latter particularly became changed to the parallel of 49° from the Equator, instead of the highlands inclosing the Northern waters running directly or indirectly into the Misipi, as settled by Louis XIV. Canada being, by the peace of 1763. transferred to England, it's Southern boundary was settled by the treaty of 1783. with the US. along the St Croix & highlands bounding the Southern waters of the St Lawrence, the 45^{th} degree of latitude to the water communication between the lakes, and along that communication to the lake of the woods; whence the line of the US. was to run due West, till it should strike the Missisipi. Now, according to the maps of that time, and particularly Mitchell's on * which the boundary of 1783. was predicated, the line of 49° passes through the Southern part of the lake of the Woods: and the North Western point of the lake of the Woods, as observed by Thompson, Astronomer to the North West company, is in Lat. $49^{\circ}-37'$. [McKenzie's 2. voyage chapt. 13.] At that lake therefore the English negotiators ceased to pursue the water communication, because, South of the latitude of that lake, they owned nothing: and to have followed the water line further Northwardly, would have broken in upon the continuity of their Southern boundary. Canada

* The identical map used by the negociators, with their MS. marks on it, is deposited in the office of state.

was thus closed to the West, by it's Northern & Southern limits meeting in a point in the lake of the Woods. It was at that time believed that the Missisipi, heading North of 49° would have been intersected by that line of latitude, and our possessions consequently closed. But subsequent information rendered it probable that that river did not extend so far North; (it is now said only to $47^{\circ} 38'$) and consequently that there was an unclosed space between it's source & the lake of the woods. Without undertaking to decide what were the limits dividing Great Britain & Spain in that quarter, we concluded it would be safest to settle, as occasions should offer, our boundary there with both nations, on the principle of '*valeat quantum valere potest*' with each. Having to form a convention with England for ascertaining our limits in the North Eastern quarter, we took that occasion for closing, as far as depended on her right, the vacancy in our North Western angle; & therefore proposed it to her. While negotiations were going on at London for this purpose, an opportunity occurred of our acquiring Louisiana: and the stipulations being promptly concluded, a treaty for that acquisition was actually signed at Paris twelve days before that of London was concluded. But this treaty was not known to the negociators of either party at London; nor could the rights acquired by it, be affected by arrange-

ments instituted & compleated there merely for the purpose of explaining and supplying the provisions in the treaty of 1783. In result, this acquisition rendered these explanations unnecessary, and the Vth article respecting them merely nugatory. For England holding nothing in that quarter Southward of 49° the line proposed in the Vth article, from the North Western point of the lake of the Woods Southwardly to the nearest source of the Miſipi, is through a country, not belonging to her, but now to the US. Consequently the consent of no other nation can now be necessary to authorize it. It may be run, or not, and in any direction which suits ourselves. It has become a merely municipal object respecting the line of division which we may chuse to establish between two of our territories. It follows then that the Vth Article of the Convention of London of May 12. 1803. should be expunged, as nugatory ; and that instead of it, should be substituted one declaring that the dividing line between Louisiana & the British possessions adjacent to it, shall be from the North Western point of the Lake of the Woods, along the water edge Westwardly to it's intersection with the parallel of 49° North from the Equator, then along that parallel (as established by the treaty of Utretcht between Gr. Britain & France) until it shall meet the limits of the Spanish province next adjacent. And it

would be desirable to agree further that, if that parallel shall, in any part, intersect any waters of the Missouri, then the dividing line shall pass round all those waters to the North until it shall again fall into the same parallel, or meet the limits of the Spanish province next adjacent. Or, unapprised that Spain has any right as far North as that, & Westward of Louisiana, it may be as well to leave the extent of the boundary of 49° indefinite, as was done on the former occasion.

Jan. 15. 1804.

THE EXPLORATION OF THE
RED, THE *BLACK*, AND THE
WASHITA RIVERS.

**This Manuscript presented to the
American Philosophical Society
by D. Parker**

Phil: 18 July 1817

Rec^d thro' Dr Cutbush

Extract from the ~~Message~~ from
the *President* of the UNITED
STATES, read in Congress,
February 19, 1806.

“H AVING been disappointed, after considerable preparation, in the purpose of sending an exploring party up that river, in the summer of one thousand eight hundred and four, it was thought best to employ the autumn of that year in procuring a knowledge of an interesting branch of the [Red] river called the Washita. This was undertaken under the direction of Mr. Dunbar, of Natchez, a citizen of distinguished science, who had aided, and continues to aid us, with his disinterested and valuable services in the prosecution of these enterprises. He ascended the river to the remarkable hot springs near it, in latitude $34^{\circ} 31' 4''.16$, longitude $92^{\circ} 50' 45''$ west from Greenwich, taking its courses and distances, and correcting them by frequent celestial observations. Extracts from his observations, and copies of his map of the river, from its mouth to the hot springs, make part of the present communications. The examination of the Red river itself, is but now commencing.

TH: JEFFERSON.

February 19, 1806.



Guill'° Dunbar





JOURNAL

OF A

Voyage

Commencing at *S^t. Catherines* landing, on the East bank of the *Mississippi*, proceeding downwards to the mouth of the *Red* river, and from thence ascending that river, the *Black* river and the *Washita* river as high as the *Hot-Springs* in the proximity of the last mentioned river.



This voyage was undertaken by
the late *William Dunbar Esq* of Natchez 1804
in Company with George Hunter.—

This Journal
was kept by M^r Dunbar — & is 200 pages

The Geometrical Survey of the
Rout will be found at the End consist'g of 64
Pages in his hand writing.

Philad. 18 July 1817

Jn. Vaughan



JOURNAL

OF A

VOYAGE

SET out from St Catherine's landing in the afternoon. The Latitude of this place is $31^{\circ} 26' 30''$ North; and Longitude $6^{\text{h}} 5' 56''$ — west of Greenwich. { 1804
October 16th
Tuesday

A little below are the white cliffs 5 leagues below the Natchez the face of the cliffs is chiefly white sand surmounted by pine; the cliffs are from 100 to 200 feet high; when the waters are low the basis of the cliffs are uncovered consisting of clay of different colours and some beds of ochre covered here and there by a thin lamina of iron ore; small springs possessing a petrifying property flow over the clay and ochre; numberless logs and pieces of timber converted into stone are strewed about the beach. Fine pure argil of various colours chiefly white and red is found here. Encamped at night upon an Island 7 miles below the place of departure.

Set

1804
October
Wednesday
17th

} Set off; passed Fort Adams, and six miles farther the line of demarcation, and arrived at the mouth of red river about nine miles below the line of demarcation; encamped just within its mouth; the waters of this river have a red appearance from a rich fat earth or marl of that colour born down by the floods from which it derives its name; the mouth of the river is about five hundred and fifty yards wide: here we commenced taking the meanders of the river by course and time depending upon the log to inform us of our rate of going as well as the velocity of the Current; there is however no sensible Current at the mouth: the banks on both sides are here clothed with willows, the land is low and subject to inundation to the height of 30 or more feet above the present level of the waters, the mouth of the red river is accounted to be 75 leagues from New-orleans and 3 miles above the exit of the Chafalaya or Opelousa river which was probably the continuation of the red river, when perhaps its waters did not unite with those of the Mississippi excepting during the inundation. M de Ferrer has settled the Latitude and Longitude of this place; the first at $31^{\circ} 1' 15''$ N. and the last at $6^h 7' 11''$ west of Greenwich.

Thursday 18th Set off up the river, remarked vegetation to be surprisingly luxuriant along the banks owing
no

no doubt to the rich red marle yearly deposited by the floods of the river — willows grow to a good size, but other forest trees are much smaller than those seen upon the banks of the Mississippi, which may be owing to the newly formed soil or its excessive richness. The river narrows gradually as we advance: at noon it was about 200 yards wide. Got out the instruments, which requiring a good deal of adjustment we were unable to make perfect observations. The Latitude $31^{\circ}.8'.54''.6$, perhaps accurate enough to correct the traverse of the river.* The banks of the river are luxuriantly clothed with pea-vine and several kinds of grasses yielding seed, of which geese and ducks are very greedy: got our log line prepared and divided into perches — hove the log and found we went at the rate of 4 perches in half a minute. i. e. $1\frac{1}{2}$ mile per hour — very slow — Soldiers do not exert themselves at the oar; came to, for the night having made nearly 13 miles — hove the lead in the middle of the river and found 11 fathoms. There are generally willows growing on one side of the river, and on the other the same small growth of forest trees continues, consisting chiefly of black oak, packawn, hickory, elm &c. The Trees are so exceedingly grand & lofty upon the banks of the Mississippi, that by

* The place of observation was at the extremity of the Course N 32° E $17'$ to a pt on the left.

comparison

1804 } comparison those bordering on this river seem
October } dwarfish, and appear to bear a kind of proportion to the magnitude of their own river. The extremes of temperature were from 46° to 48° of Farhenheits thermometer. Made this day $12 \frac{55}{60}$ miles.

Friday 19th Continued our rout up the river ; having given the Soldiers this morning a few words of advice and encouragement, they improved considerably in activity and cheerfulness, hove the log and found we went 7 perches per half minute, the Current yet continues so moderate as to offer no impediment to our rowing along shore therefore not worth estimating : landed before 12 to observe and for dinner. Latitude $31^{\circ} 14' 50''$.1. After dinner caught a runaway negro ; proceeded on to the confluence of red and black river in Latitude $31^{\circ} 15' 48''$ which by our reckoning appears to be $26 \frac{1}{3}$ miles from the Mississippi, the Contrast of the two rivers is great, the red river being charged with red marly earth and the other a clear river gives it by comparison a dark appearance, hence the name of black river — Each river is about 150 yards and when united about 200 yards wide. Sounded in the black river and found 20 feet black sand, little or no current. Took specimens of the red marl of red river bank. The water of the black river is rather clearer than that of the Ohio and of a
warm

warm temperature, probably owing to the waters { 1804
which flow into it from the valley of the Mis- { October
sissippi particularly from the Catahoola. Made
15 miles 102 perches.

Continue ascending the river ; Thermometer Saturday 20
47° Temperature of the water 73° a spring issu-
ing from the river bank 66° Forest trees on the
banks chiefly red and black oak interspersed with
ash, paccawn, hickory, some elms, pirsimon &c;
several kinds of grass and many humble plants
in flower, so that even at this season our country
affords employment for the Botanist. Great lux-
uriance of vegetation along the shore, grass very
rank, and a thick curtain of shrubbery of a deep
green ; the soil black marl mixed with a mod-
erate proportion of sand, resembling much the
soil on the Mississippi banks, yet the forest trees
are not lofty like to those on the margin of the
great river, but resembling the growth on the
red river. I omitted mentioning in its proper
place, that the last single inundation of the red
river appears to have deposited on the high bank
a stratum of red marl above ½ inch thick now
dry ; some specimens were taken. Took a me-
ridian altitude of the Sun, from which the Lati-
tude deduced was 31° 22' 46".6—observed Canes
growing on several parts of the right bank, a
proof that the land is not deeply overflowed,
perhaps from 1 to 3 feet : the banks have the
appearance

1804 } appearance of stability, very little willow or other
October } productions of a newly formed soil being seen on
either side: the solid high bank being deeply
shaded by vegetation from the humble creep-
ing plant to the spreading oak. Encamped at
sun-set. Sounded; 5 fathoms—black sand—
Extremes of the Thermometer 47°–80°. Made
this day 13 miles 40 perches.

Sunday 21st Thermometer before sun-rise 60°. Continue
ascending; no current to impede us, for altho'
there be a feeble current along the principal
thread of the stream, yet as this is deflected
from bend to bend, we easily avoid its influence
by directing our course from point to point or
rather passing a little under the points, and in
fact where there is any current, a compensation
is found by the counter current or eddy under
the points. The river is now only 80 yards wide;
the timber becomes larger, the banks in some
places 40 feet high, yet liable to inundation, not
from the floods of this small river, but from the
intrusion of its more powerful neighbour the
Mississippi: The lands decline rapidly (as in all
alluvial countries) from the margin to the Cy-
press swamps, where more or less water stag-
nates all the year round. The current of the
river is still so insensible even in the thread of
stream, that we take no account of it: at 8^h a.m.
we arrived at an Island, small but elevated, said
to

to be the only one in this river for more than 100 leagues ascending. On the left bank near the Island is a small settlement commenced by a man and his wife: a covered frame of rough poles without walls serves for a house, and a Couple of acres of indian corn had been cultivated, which suffices to stock their little magazine with bread for the year; the forest supplies Venison, Bear, turkey &c, the river fowl and fish; the skins of the wild animals and an abundance of the finest honey being carried to market enables the new settler to supply himself largely with all other necessary articles; in a year or two he arrives at a state of independence, he purchases horses, cows & other domestic animals, perhaps a slave also who shares with him the labours and the productions of his fields & of the adjoining forests. How happy the contrast, when we compare the fortune of the new settler in the U. S. with the misery of the half starving, oppressed and degraded Peasant of Europe!! — The banks here are not less than 40 feet above the present level of the river water and but rarely *overflowed*; the nearest road to the high lands at the Rapid-settlement on the red river, nearly west is said to be 40 miles thro' an inundated alluvial country; it is probable the direct distance does not much exceed one half, the numerous lakes in the overflowed lands rendering the road very circuitous: both banks are clothed with

{ 1804
October

1804 } with rich Cane-brake, pierced by many creeks
 October } fit to carry boats during the inundation: saw
 many Cormorants and the stately Hooping
 Crane: Geese and Ducks not yet abundant;
 they arrive in myriads with the rains & winter
 cold: Landed before noon to observe: we had
 been disappointed at the hour of breakfast by
 clouds in making observations for the magnetic
 variation and for regulating the time & rate of
 going of the watch, preparatory to the lunar
 observation, & now apprehended the same dis-
 appointment, the heavens being loaded with
 flying clouds: just before the Sun was expected
 on the meridian, a dense cloud concealed him
 from view, when he reappeared he was already
 dipped a little; the latitude deduced is undoubt-
 edly too far North $31^{\circ} 37' 52''.5$ the sun had
 therefore not attained his meridian altitude.

This afternoon found the shore favorable for
 tracking, (i. e.) running along shore & towing
 the boat; rate of going by log a little improved
 5 perches p^r $\frac{1}{4}$ minute. At 3^h p. m. therm^r
 83° . — The banks have a regular shelving slope
 from the top to the water's edge & are totally
 covered with the most luxuriant herbage con-
 sisting chiefly of 5 or 6 kinds of strong grass
 yielding vast crops of seed nearly mature, upon
 which Geese and Ducks get surprisingly fat:
 we shot some water fowl of the Duck kind,
 whose web-foot was partially divided, the body
 covered

covered with a bluish or lead coloured plumage; they were extremely fat and excellent, resembling in taste the Canvass-back. The teal of these rivers is also very fat and fine. Wind S.S.E. and cloudy. Encamped. Extremes of the thermometer 60° – 83° . Made this day 14 miles 59 perches. { 1804
October

Thermometer before sun-rise 65° Wind S.S.E. Monday 22^d cloudy. A few drops of rain before day : set off as soon as we could get the men ready & on board. — Soldiers slow in their movements — continues cloudy & threatens rain. Green matter floating on the river, supposed to come from the Catahoola and other lakes and bayoos of stagnant water, which when raised a little by rain flow into the black river. Saw also many patches of an aquatic plant resembling little Islands, some floating on the surface of the river, and others adhering to or resting on the shore and logs; examined the plant & found it to be a hollow jointed stem with roots of the same form; extremely light with very narrow willow shaped leaves projecting from the joint, embracing however the whole of the tube extending to the next inferior joint or knot; the extremity of each branch is terminated by a spike of very slender and narrow seminal leaves from one to two inches in length and $\frac{1}{10}$ or less in breadth, producing its seed on the under side of

1804 } of the leaf in a double row, almost in contact,
October } the grains alternately placed in perfect regularity: I have not been able to detect the flower, so as to be able to determine the class and order to which the plant belongs, it is not probably new; I at first supposed it might be the same which is described by M^r Bartram as occupying large portions of the surfaces of rivers in East Florida, but upon examination I found it to be entirely different.

The day continued cloudy; at noon it rained, we had consequently no observation for the Latitude. At 3^h p. m. therm^r at 79° — the afternoon continued cloudy. The current is yet insensible as to any opposition made to our progress. Sounded in the evening, found 3½ fathoms, the river being now considered very low. Extremes of the therm^r 65°–79° Wind S.S.E. Cloudy — made 13 miles 76 perches.

Tuesday 23^d Thermometer 68° — the river for several nights past has fallen about 3 inches perpendicular each night: observed a great number of muscles and periwinkles along shore: the muscle is of the kind commonly called pearl-muscle, & by means of its long tongue makes considerable progress along the bottom & upon the beaches of the river when under water: our people had a quantity of them dressed and found them to be agreeable food: to me they were tough and unpalatable.

unpalatable. The wind altho' a head but not strong, we got along pretty well; but towards 11^h a. m. it became much stronger, and we made little way. Notwithstanding the cloudy state of the atmosphere we were fortunate in getting a good meridian observation, by which it appears we were in Lat: $30^{\circ} 36' 29''$ nearly 3 miles higher than the town of Natchez: after dinner proceeded to the mouth of the Catahoola on the left and landed to get information from a french man settled here: he has a grant of land from the Spanish government, has made a small settlement and keeps a ferry-boat for crossing men & horses traveling to or from Natchez and the settlements on red river and on the Washita river: the Country here is all alluvial; in process of time the rivers shutting up ancient passages & elevating the banks over which their waters pass, no longer communicate with the same facility as formerly; the consequence of which naturally is that many large tracts formerly subject to annual inundation are now entirely exempt from that inconvenience: such is the situation of a most valuable tract upon which this french man is settled: his house is placed upon an Indian mount with several others in view: there is also a species of rampart surrounding this place & one very elevated mount; all of which I propose to view and describe on my return, our situation not now admitting

{ 1804
October

1804 } admitting delay: the soil here is equal to the
 October } best Mississippi bottoms; the proprietor says the
 high mount is not less than 80 feet perpendicular, of this we shall form some estimate at our return. We obtained from him the following list of distances from the mouth of the red river to the Post on the Washita called Fort Miro.

From the mouth of Red river to the mouth of black river	10 Leagues
To the mouths of Catahoola, Washita & Tenza	22
To the River Ha-ha on the right	1
To the Prairie de Villemont on the same	5
To Bayoo Louis on the same — rapids here	1
To Bayoo Boeufs on the same	4
To the Prairie Noyée (drowned Savannah)	3
To Pine point on the left	4½
To the Bayoo Calumet	3½
To the Coal mine on the right & Gypsum on the opposite shore	3
To the 1 st Settlement	12
To Fort Miro	22
	<hr/>
	Leagues 91.

The accounts of the low state of the river we receive here are rather discouraging, as it appears, that on the first rapids, seven leagues distant there are only 22 inches of water, and we now draw at the stern 30 inches or more. — Went on and encamped within the mouth of the river Washita. This river derives its appellation from the name of an indian tribe formerly

merly resident on its banks, but now no more to be found; it is said that the remnant of the nation went into the great planes to the westward & either compose a small tribe themselves, or are incorporated into another nation. The Junction of the Washita with the Tenza and the Catahoola a little below, all together form the black river, which last here, loses its name, altho' our maps represent it as taking place of the Washita: the Tenza and Catahoola are also names of ancient tribes now extinct: the latter is now the name of a Creek or bayoo 12 leagues long, which is the issue of a lake of the same name 8 leagues in length & 2 leagues generally in breadth, it lies west of this place & communicates with the Red river during the time of the great annual inundation; it receives at the West or N.W. angle a Creek called little river, which preserves a channel with running water at all seasons, meandering along the bed of the lake; but all other parts of its superficies during the dry season from July to november & often latter, are completely drained & become clothed in the most luxuriant herbage: the bed of the Lake then becomes the residence of immense herds of Deer, of Turkeys, Geese, Ducks, Cranes &c &c feeding upon the grass and grain; the Duck species being generally found on or near the little river. The Bayoo Tenza serves only to drain off a part of the waters of the
inundation

{ 1804
October

1804 } inundation from the Mississippi low lands which
October } here communicate with the black river during
the season of high waters. By reference to our
Latitude at Noon we find the mouth of the
Washita to be in Lat: $31^{\circ} 37' 57''$ — Extremes
of the thermometer 68° — 73° . Sounded — found
6 fathoms — muddy bottom. Made this day 9
miles $77\frac{1}{2}$ perches.

Wednesday 24th Thermometer before sun-rise 54° — Wind
North — Cloudy — Temperature of the river
water 71° . No current to impede our progress
worth estimating. Made slow advancement as
usual with our oars; found the shore favorable
for tracking or towing, which mode we con-
tinued nearly all day making at the rate of five
perches p^r $\frac{1}{2}$ minute, which is about half a
perch more than by rowing: a boat properly
constructed for an expedition of this nature
ought to advance with more than double our
velocity. The wind was contrary all day other-
wise we might have gone at the rate of 6
perches which is equal to $2\frac{1}{4}$ miles per hour,
more might be performed, but our Soldiers seem
at certain times to be without vigour & now
and then throw out hints that they can work
only as they are paid.

The high lands on both sides have now the
appearance of being above the inundation; the
timber is such as is generally produced upon
high

high lands chiefly Oaks, red, white & black; { 1804
interspersed with a variety of others; the mag- { October
nolio grandiflora is absent; its presence is an
infallible sign of lands not subject to inundation.
We observed to day along the banks the strata
of solid clay or marl (not recent but apparently
ancient) to lie in very oblique positions, some
making an angle of nearly 30° with the horizon
& generally inclined with the descent of the
river, altho' in a few cases the position was con-
trary; timber was also seen projecting from
under the solid bank, which last seems to be in
some measure indurated; it is unquestionably
very ancient presenting a very different appear-
ance from the recently formed soil: the river is
here about 80 yards wide. The Bayoo Ha-ha
comes in unexpectedly from the right about a
league above the mouth of the Washita, and is
one of the many passages or issues thro' which
the waters of the great inundation penetrate &
pervade all the low countries, annihilating for
a time the currents of the lesser rivers in the
neighbourhood of the mississippi. Vegetation is
extremely vigourous along the alluvial banks;
the twining vines entangle the branches of the
trees & expand themselves along the margin of
the river, in the richest and most luxuriant fes-
toons, and often present for a great extent a
species of impenetrable Curtain varigated and
spangled with all possible gradations of Color
from

1804 } from the splendid orange to the enlivening green
October } down to the purple & blue and interwoven with
bright red and russet brown. A carpet of the
finest shrubbery overspreads the elevated margin,
composed of a variety of elegant vegetables, to
many of which probably no names have yet
been assigned by the Botanist; and in positions
where the shade is not too deep, the surface is
enameled with thousands of humbler plants in
full blossom at this late season.

The day has continued cloudy but begins to
clear away about 11^h a.m. we therefore landed
before noon to observe & found our Latitude to
be 31° 42' 30".5—The timber of the higher
grounds is still remarked to be inferior in size
and height to that on the Mississippi; but here
it may be accounted for by a less fertile soil, not
apparently (at most rarely) subject to inundation.
The wind still continues in the N. or N.N.W.
but the clouds are dissipating and tomorrow we
expect fair weather, for making observations.
Extremes of the thermometer 54°—68°. En-
camped after completing a poor days voyage
of 14 miles 48 perches. Therm: at 8^h p.m.
54°. —

Thursday 25th Therm: in air 49° — in river water 68°. Wind
north. Cloudy. Continued & passed Villemont's
prairie on the right & pine point opposite: the
prairie obtained its name in consequence of its
being

being included within a grant under the french Government to a gentleman of that name; some of the family & name yet remain at New Orleans but I have not heard of any claim for this land; many other parts of the Washita are named after their early proprietors: the french people projected & began extensive settlements upon this river, but the general massacre planned & in part executed by the Indians against the french, and the consequent massacre of the Natchez tribe by the french, broke up all those undertakings & they were not re-commenced under the french government. Those prairies are planes or savannahs without timber, generally very fertile, producing an exuberance of strong thick and coarse herbage. When a piece of ground is once got into this state in an indian country, it can have no opportunity of re-producing timber; it being an invariable rule to fire the dry grass in the Fall or winter, to obtain the advantage of attracting game when the young tender grass begins to spring; & thus the young timber is destroyed, & annually the prairie gains upon the wood land; it is probable that the immense planes known to exist in America may owe their origin to this practice. The planes of the Washita lie chiefly on the East side, & being generally formed like the Mississippi lands sloping from the bank of the river towards the great river, they are more or less liable to the influence of
inundation

{ 1804
October

1804 } inundation in the rear, which has been known
 October } to advance so far in certain great floods, as to be ready to pour over the margin into the Washita river ; this however has now become a very rare case & it may generally be estimated that from $\frac{1}{4}$ mile to a whole mile in depth will remain exempt from inundation during high floods : and this is pretty much the Case with those lands nearly as high as the Post of the Washita, with the exception of certain ridges of primitive high land ; the rest being evidently alluvial, altho' not now subject to be inundated by the Washita river, (which has originally caused their formation), in consequence of the great depth, which the bed of the river has acquired by abrasion.

We saw a good deal of high land to day on either bank producing pine and other timber not the growth of inundated lands. About a league beyond Pine point we arrived at Bayoo Louis on the right, being the commencement of the rapids or rather shallows : Sent people into the water to search the best channel, and after being frequently aground and dragging the boat we got up into a situation about a mile higher, where we were in a manner embayed, being shut in by a gravel-bar upon which there was scarcely in the deepest part a foot of water : finding the men fatigued by being so much in the water at hard labor, we thought it best to

rest

rest for the remainder of the day and consult upon what was best to be done.—The bar being of inconsiderable breadth & no rock in the bottom as we had been taught to expect, it was thought best to cut a channel sufficient for the passage of the boat, which we supposed would take less time than unloading, transporting & reloading at a considerable distance from our present station.—The weather continued damp and disagreeably cold all day : we had no observation at noon. Extremes of the Therm: 49°–60° Wind at North. Clearing up — many stars to be seen in the evening : made 3 miles 120 perches.

Thermom' in air 40° in river water 65° — Friday 26th
Wind N.W. light clouds. The morning being very cool, it was thought best for the people to take an early breakfast before going into the water to work. After breakfast commenced digging the cannal which was required to be about an hundred feet long : this business went on heavily & slowly as usual, and it was not untill noon that it was made barely of the depth which it was supposed might pass the boat.

The day being fine made some observations for the regulation of the watch & for the magnetic variation, and at noon had a fine observation, from which the Latitude of this remarkable place was ascertained to be $31^{\circ} 48'.57''.5$ — a little

1804 } little way up the river $\frac{1}{4}$ of a mile there is a
 October } high ridge of primitive earth studded with an
 abundance of fragments of rock or stone, which
 appears to have been thrown up to the surface
 in a very irregular manner, the stone is of a fri-
 able nature, & some of it has the appearance
 of indurated clay; without it is blackish from
 being exposed to the air, and within of a grey-
 ish white: it is said that within the hill, the
 strata are regular, & that good grind-stones may
 be obtained. After dinner the boat was moved
 into the channel, where she stuck fast. Cables,
 ropes and pulies were got across and fixed to
 trees: handspokes were used to raise & push
 her along and we made some way thro' the bar,
 but evening coming on we were obliged to de-
 sist in hopes of being able to get over in the
 morning. Extremes of the thermom: 40° – 70° .
 Wind N.W. Clear star light. Discovered a barge
 coming up behind us; she also grounded & sent
 her people out to search for the channel.

Saturday 27th Thermometer in air 32° in river water 64°
 Wind N. Clear above. A fog upon the river,
 occasioned by the condensation of vapor arising
 from the surface of the river: the morning be-
 ing very cold with a hoar-frost, the people were
 directed to get their breakfasts and prepare to
 use their exertions in getting the boat over the
 shoal; the day proved very fine with an agree-
 able

able warm sunshine, but it was 1^h p.m. before { 1804
we got entirely over into floating water on the { October
opposite shore, the men having upon this occasion exerted themselves to my entire satisfaction. The occupation of this day prevented us from making any astronomical observations.— After dinner we pushed on and arrived at the last of the rapids at this place; here we found a ledge of rocks across the entire bed of the river, but having previously sounded and discovered the best channel, we got over into deep water after grounding and rubbing two or three times: The river became again like a mill-pond without current, excepting a motion barely perceptible along the concave shore, the velocity was nevertheless very considerable upon the shoals where the depth of water was small. The whole of those first shoals or rapids embraced an extent of $1\frac{1}{2}$ miles; that is, the obstruction was not continual, but felt at short intervals along this space: Encamped about $1\frac{1}{2}$ mile above the last rapid. Extremes of the therm: 32° – 73° . The evening proves fine & mild. Therm: at 8^h p.m. 62° . Wind North. High pine land on the right — breadth of the river 100 yards.

Thermometer in air 40° — in river water 63° Sunday 28th
— Wind N.W. Clear—fog on the river. Continued our voyage & made some observations for the Longitude & magnetic variation at the hour
of

1804 } of breakfast. High lands and a large Savannah
October } seen on the right in the morning passed a rocky
hill soon after and 'Bayou aux bœufs' on the
right about 4 leagues from the rapids. At noon
got a good observation, Latitude deduced $31^{\circ} 53' 35''.5$ — at 3^h p.m. the thermom^r was at 78° in
the shade; the day was warm and the sun power-
ful: observed some more planes to the left: the
river made several returning courses to day, to
the southward of west. Thermom^r at 8^h p.m. 56°
— Extremes 40° – 73° . Sounded — 3 fathoms —
mud & sand. Made this day 12 miles 116 perches.

Monday 29th Thermom^r in air 41° in river water 62° Wind
N.W. Fog on the river. Continued our voyage
— The banks of the river seem to retain very
little alluvial soil; on the opposite shores we see
frequently to the water's edge the high land
earth, which is a sandy loam of a greyish light
color with streaks of red sand & clay; the soil
is not rich, bearing great numbers of pines, in-
terspersed with red oak, hickory and dog-wood.
The river is now from 60 to 100 yards wide.
At the hour of breakfast made three lunar ob-
servations, and one sun's altitude to regulate the
watch, which with the observations of yester-
day will give the rate of going of the watch
proportioning for change of Latitude and de-
parture as we advance in the progress of our
voyage; I do not however think it of much
importance

importance to regard those observations until we arrive at the post of Washita, which I suppose to be nearly the most easterly point of the river; there and at the hot-springs (the most westerly point we shall visit) we shall take time to make correct observations; all other points of the river will be ascertained with sufficient precision from our geometrical survey so frequently corrected by the Latitude. At Noon we found our Latitude to be $31^{\circ} 58' 2''$. Having made some advantageous alterations in the arrangement of our benches and oars, we advanced with a little better speed; about 6 perches p^r $\frac{1}{2}$ minute which however does not exceed $2\frac{1}{4}$ miles p^r hour in water without any sensible opposition from the Current. The wind came about to S.W. in the evening; Therm^r at 8^h p.m. 62° Extremes 41° — 85° . Soundings—3 fathoms mud & sand — made this day 14 miles 65 perches.

Thermom^r in air 47° in river water 60° Wind Tuesday 30th W.N.W. Fog on the river. Clear above.—Continued our voyage: the land on either bank seems to be from 30 to 40 feet high and does not improve in quality: pine-trees seen in most situations—nothing remarkable occurred except a rapid we passed in the afternoon, formed by a ledge of rocks which traversed the river, narrowing the water channel to about 30 yards, but the extent between the high banks was not less

1804 } less than a hundred. At noon found the Latitude
October } to be $30^{\circ} 5' 24''$. It would appear from the distances run by our Log and time, when compared with the estimated distances by the french inhabitants and hunters, that their league scarcely exceeds two miles. Encamped near a sand beach favorable for hauling the sene & caught a sufficiency of fish to serve all the people for supper and breakfast. Therm: at 8^h p.m. 60° Extremes 47° — 83° . Made this day 15 miles, 150 perches.

Wednesday 31st Thermom: in air 44° in river water 62° Wind N.N.W. Clear — fog on the river — Continued our voyage. This morning met with shallow water & strong currents, our rate of going, deducting the velocity of the stream was reduced to 2 perches : got upon shoals about 8^h a.m. which detained us greatly, and impeded us more or less untill the afternoon ; at noon we had a good observation ; Lat : found $32^{\circ} 10' 13''$ — at 2^h p.m. got over the last shoal for this day & went on in good water untill the evening, the channel was very narrow, the sand bars at every point extending so far into the bend as to leave little more than the breadth of the boat of water sufficiently deep for her passage, altho' the water often covered a breadth of 70 to 80 yards upon the shoal : in the afternoon passed a little plantation or settlement on the right and at night came up with three others joining each other :
here

here is a plane or prairie upon which those settlements are placed ; from the regular slope of the land from the river bank towards the eastward, we may be assured the soil is alluvial, yet the bed of the river is now so deep that it is no longer subject to that inconvenience, but in the rear the Mississippi advances & sometimes leaves dry but a narrow stripe along the banks, it is however now more common that the extent of the fields cultivated (from $\frac{1}{4}$ to $\frac{1}{2}$ mile) remain dry during the season of the inundation : the soil here is very good but not equal to mississippi bottoms ; it may be esteemed second rate. At a small distance to the East are extensive Cypress swamps, over which the waters of the inundation always stand to the depth of 15, 20 & 25 feet. On the west side after passing over the Valley of the river, whose breadth is various from $\frac{1}{4}$ to 2 miles or more, the Land assumes a considerable elevation from 100 to 300 feet and extends all along to the settlements on the Red river ; those high lands from report are poor & badly watered, being chiefly what is termed a pine-barren : there is here a ferry & a road of Communication between the Post of the Washita and the Natchez & a fork of this road passes on to the Settlement called the rapids on Red river, it is distant from this place by computation 150 miles.

{ 1804
October

From the experience we have had of this
river

1804 } river and the information obtained, it appears
 October } that the present is the least favorable season for ascending this river with a boat of so considerable a draught of water as ours; the spring of the year is the most advantageous, the Mississippi then flows up into the beds of the inferior rivers, raising their waters sometimes within a few feet of the top of the banks; the small current is then often in favor of the ascending boat: this objection would vanish if light boats were used drawing only 6 or 8 inches of water & if well constructed might make with ease 12 leagues or even 40 miles p^r day; such ought to be the kind of boats for an expedition fitted out to explore; as little time as possible ought to be lost in moving, that more may be left for observation and research: in our actual situation our daily progress seldom equals 14 or 15 miles, which is a sad drawback upon the accomplishment of the objects of an exploring expedition. On this part of the river lies a considerable grant of Land conceded by the Spanish Government to the Marquis of Maison rouge a french emigrant, who bequeathed it with all his property to M. Bouligny son of the late Colonel of the Louisiana regiment & by him sold to Daniel Clark; it is said to extend from the post of the Washita with a breadth of two leagues including the river down to the bayou Calumet, the computed distance of which along the river is called

called 30 leagues, but said to be not more than { 1804
12 in a direct line. Extremes of the thermom: { October
44°-84°. Made this day 6 miles 165 perches.

Thermom: in air 48° in river water 62° — { November
Calm—clear above, a little fog on the river. { Thursday 1st
Having sounded last evening a shoal upon
which there is 18 inches water in the deepest
place, we prepared, by unloading part of our
Cargo, to cross it : we obtained the use of two
Canoes, which with a good deal of trouble
enabled us to get over about noon : finding a Ca-
noe so useful & being informed of other rapids
and shoals before us, we bartered away a smaller
canoe with a little cash for the larger of the
two we had borrowed, proposing to put two
of our best hunters into the empty Canoe by
which they might keep a head & procure some
game, & be ready on all emergencies to assist the
Barge. Dined & continued our voyage ; met
with several retardments from shoals. Made
only 4 miles 115 perches. Extremes of the
thermom: 48°-85° at 8^h p.m. 64°. Weather ex-
tremely fine & agreeable, the slow progress of
our boat being the only circumstance of regret,
as tending to disappoint our prospects.

Thermom: in air 48° in river water 62° light Friday 2^d
clouds— Wind S.S.E. a little fog on the river.—
Continued our voyage with immense sand bars
in

1804 } in view at every point : the utmost care in steer-
 November } ing was necessary to keep clear of shoals and
 sunken logs, which latter were frequently very
 embarrassing : we suffered much detention this
 day from those causes, being twice fast upon
 a sunken log under water, and our boat being
 so unwieldy & heavy, there was no getting her
 off by any exertion of poles &c which could
 be made on board, a rope was carried ashore
 from the stern, & by that means she was hove
 backwards & cleared of the log : we lost $1\frac{1}{2}$
 hour each time by two such accidents, & sev-
 eral times got upon shoals which delayed us
 greatly : light flat boats proper for the naviga-
 tion of shallow waters would pass over all such
 obstacles without touching, & when they do
 touch, being light, they are easily pushed back ;
 external keels are very improper for any boat
 upon the mississippi or any river where logs are
 to be encountered : our boat to her other in-
 conveniencies was provided with a keel, which
 added to her draught of water, made her much
 more difficult to get over a log or shoal, it being
 impossible to clear her by pushing latterally.
 Therm^r at 8^h p.m. 78° Extremes 48°-84°. Made
 this day 8 miles 104 perches.

Saturday 3^d Therm^r in air 52° in river water 64°. Some
 light clouds. Continued our voyage with very
 little variety, a great sameness appears as to the
 river

river and its banks. Altho' we got several times aground we were not so unfortunate as yesterday; immense sand bars or beaches with steep banks on the opposite shore continued to be the objects of our view, very little alluvial land except at some points opposed to Cliffs, was to be seen: along the margin of the river, many humble plants are to be seen in flower at this late season, altho' the leaf falls from the trees of the forest: the great variety of tints which the foliage assumes before it separates finally from the parent stock, presents to the Eye an infinitude of beautiful landscapes, and if critically examined is perhaps not without its use: it will be found that the leaves of the same tree are all changed to the same Color, which is probably occasioned by the oxygen of the atmosphere acting upon vegetable matter deprived of the protecting power of its vital principle, & thereby calls forth its latent colorific properties: I have always remarked that the leaves of such trees whose barks and woods are known to produce a dye, are changed in autumn to the same Colour, which is extracted in the Dyer's vat from the woods more especially by the use of alumn or other mordant; whose predominant principle yields oxygen: thus the foliage of the hickory & the oak yielding the quercitron bark is changed before its fall to a beautiful yellow; other oaks assume a fawn colour, a liver or blood colour, and

1804 } and are also known to yield dyes of the same
November } complexion: I am persuaded from the few observations I have made that this rule will be found general, and may therefore serve as an excellent guide to the Naturalist who directs his researches to the discovery of new objects for the use of the Dyer.

At noon we found ourselves in Latitude $32^{\circ} 17' 17''$ — nothing remarkable occurred in the afternoon, except a discovery made by D^r Hunter (walking along the river side) of a substance resembling mineral Coal: I suppose from its appearance, that it is the Carbonated wood described by Kirwan and other Chemists: some specimens were preserved; it does not easily burn, but on being applied to the flame of a candle, it seemed to encrease it & yielded a faint smell resembling, in a slight degree that of the gum-lack of common sealing wax. In the evening passed over some rapids and shoals; bottom stone & gravel. Thermom^r at 8^h p.m. 72° . Extremes 52° – 86° . Made this day 11 miles 140 perches.

Sunday 4th Thermom^r in air 54° in river water 64° . Clear. This has been an unfortunate day; the morning and afternoon were spent upon shoals and rapids with stoney & gravelly bottoms, the Men having been a great part of the time in the water. Got a good observation at noon; Latitude found 32°

32° 21' 10". Made only 4 miles 233 perches. { 1804
Thermom: at 8^h p.m. 63° Extremes 54°—83. { November

Therm: in air 52° in river water 62° heavy Monday 5th
fog & damp air. We were obliged this morning
to take out part of our loading to enable us to
pass over a shoal carrying only 18 inches water,
which detained us untill near 10^h a.m. — In the
course of the day got upon several shoals of in-
ferior note, but upon the whole we were more
fortunate than usual, the water being generally
deeper and with little current. We remarked a
greater appearance of fertility as we approached
the Settlement; the trees are of larger dimen-
sions, & there is a due proportion of shrub or
underwood, which was absent in the poorer
lands; some fields of Cane began to appear,
which is a sure indication of a fertile soil: we
had also leisure to admire the beautiful tints
assumed by the foliage of the vegetable world:
it was apparent that the external leaves most
exposed to the light & to a freer circulation of
air, exhibited the first changes of Color, while
those of the same plant under a thick shade still
retained their deep verdure. The Willow tree
pendent over the water, presents a fine deep yel-
low along the outline of the plant, from whence
may be traced a regular gradation, thro' the ad-
mired lemon color down to the soft and delicate
summer's green, which last in the shade, retains
its

1804 } its full verdure: on other trees may be seen a
November } deep blood color inclining to black, descending by regular shades to the palest pink mingled with green & from thence by similar gradation to the usual summer verdure of the plant: Leaves plucked from the tree at this season & preserved in the shade will retain their beautiful colors for a great length of time.

The river continues of the same general breadth. i. e. from 80 to 100 yards, but the water channel is often confined to 30 yards. The Atmosphere had this day a smokey or misty appearance; the Sun broke forth a little in the afternoon, but shone with diminished lusture. This smokey or misty appearance which in our Country is common in the months of november and december is attributed to a common practice of the Indians and Hunters, of firing the woods, planes or savannahs; the flames often extending themselves some hundred of miles, before the fire is extinguished; it is observed that rain always follows those conflagrations; sometimes the condensation of the smoke occasions a fine rain resembling a fog or thick dew, but at other times the rain is impetuous accompanied by thunder & lightening & immediately after it clears up fine, but not always without a continuation of the blue misty appearance of the Atmosphere.

Soft friable stone is frequently seen and great loads

loads of gravel and sand upon the beaches; red-
 dish Clay appears in strata much indurated and
 blackened by exposure to light and air. — The
 water of this river is extremely agreeable to
 drink and much clearer than that of the Ohio;
 in this respect it is very unlike its two neigh-
 bours the arcansa and red rivers; whose waters
 are extremely charged with earthy matter of
 a reddish brown color, giving to the water a
 chocolate-like appearance; & when those rivers
 are low their waters are not potable, being ex-
 tremely brakish, from the great number of salt
 springs flowing into them & very probably from
 the beds of rock-salt over which, (it has been
 reported) they flow: the inconvenience from this
 cause, to voyagers, is not so great as might be
 apprehended, as it appears that brooks & springs
 of fine water falling into those rivers, particu-
 larly the arcansa, are very frequent, and may be
 met with often in the course of a days progress.
 — Altho' the water of the Washita river does
 not exhibit any saline impregnation, yet from
 report there are many situations in its neigh-
 bourhood where salt may be procured by dig-
 ging pits in the places called salt-licks, where
 water is found equally strong with sea-water; we
 expect to examine some of those on our way
 upwards. Thermom^r at 8^h p.m. 58° Extremes
 52°–68° Wind at N.W. Made this day 11 miles
 276 perches.

Thermom^r

{ 1804
 November

1804
November
Tuesday
6th

Thermom' 45° in air—in river water 64°—
heavy fog Wind W. Continued our voyage with
better fortune ; that is, we escaped any consid-
erable obstructions from rapids and sand bars.
No variety was to be seen in the appearance of
the Country on either side the river. At noon
got a fine observation about a league below the
Post of Washita; Latitude deduced 32° 28' 58";
by the sinuosities of the river it appears we are
not more than a mile to the south of it : arrived
there about 3½^h p.m. and were very politely
received by Lieu^t Bowmar, who immediately
offered us the hospitality of his Dwelling with
all the services in his power. The Position called
Fort Miro being the property of a private per-
son, who was formerly civil commandant here,
the Lieutenant has taken post about 400 yards
lower and has built himself some log-houses and
enclosed them with a slight stockade: this young
officer exclusive of the manners of a polite Gen-
tleman, appears to possess talents ; he has formed
a tollerably good chart of the river from its
mouth to the Post, being the result of his own
labors on the way up to take possession of the
Post, this he has continued upwards from the
best information he has been able to obtain ;
the whole gives a satisfactory idea of the river
& part of the Country ; we have also obtained
some further information from the former Com-
mandant a french man, and other persons here,
of

of all which we have made notes & shall avail
ourselves in the prosecution of our voyage. { 1804
November

Thermom^r at 8^h p.m. Extremes 45°–79° Made
this day 9 miles 257 perches; amounting in the
whole to 196 miles 256 perches from the mouth
of the red river to the Post of the Washita; and
by the old computation 90 leagues.

Thermometer in air 52° in river water 64° Wednesday 7th
Clear. Finding from past experience that the
boat in which we have come up, would be im-
proper for the continuation of our voyage, we
made enquiry this morning for other craft, but
it appears there is no great choice of boats at
this place; prepared also for astronomical obser-
vation: being greatly interrupted by visitants
who came to offer services &c we were pre-
vented from making any useful observation un-
till noon & even then we were incommoded:
the Sun's meridian altitude gave the Lat: 32°
29' 52".5 but I was not perfectly satisfied with
this observation; from the Causes mentioned I
suspect the altitude was taken a little too late,
& shall hope to correct if necessary by future
observations. Therm^r at 8^h p.m. 67° Extremes
52°–80°

Thermom^r in air 53° in river water 58° Thursday 8th
Cloudy. This was a disagreeable, damp and cold
day: made further enquiry for small boats with
little

1804 } little success; found only one, which with an-
November } other of the same burthen might answer our
purpose: no observation made this day. Upon
viewing the Country on the East of the river,
it is evidently alluvial; the surface is equal with
a gentle slope from the river towards the rear
of the plantations; the land here is of excellent
quality, being a rich black mold to the depth
of a foot, under which there is a friable loam
of a brownish liver color, which very probably
will itself become a good soil when broken up
& exposed to the influences of the elements.
Therm: at 8^h p.m. 56° Extremes 53°—61°

Friday 9th Thermom: in air 42° in river water 61°
Cloudy, damp & cold. Continued our search
for proper vessels and heard of a flat-bottomed
barge, which we expect will be very suitable,
with the reduced loading we intend to carry
with us, the boat will probably draw only 12
inches water: no observation, it being dark,
cloudy & disagreeable all day. Extremes of the
thermometer 42°—72°

Saturday 10th Thermom: in air 40° in river water 58°
Clear—calm—this day having the appearance
of being fine & serene, prepared for observation;
and in the course of the day took altitudes of the
Sun for the regulation of the watch and the
magnetic variation: at noon found the Latitude
by

by a fine observation to be $32^{\circ} 29' 35''$, this differs from that of the 7th by $17''$; I give the preference to the result of this day, for reasons already mentioned; In the afternoon took distances of the moon from the Sun to the west of her and in the evening took distances of the moon from α Arietis to the east of her, which may be considered as a complete series for the determination of the Longitude. { 1804
November

Having hired the barge and agreed to give $1\frac{1}{4}$ dollar p^r day for the use of her, we had her brought along side: She is upwards of 50 feet long & $8\frac{1}{2}$ feet in breadth built tollerably flat, her bottom being still a little convex & being pretty well formed for running. This boat with some improvements is probably the best form for penetrating up shallow rivers, she is undoubtedly too long, as we shall certainly meet with short turns among logs & perhaps rocks, the passage of which might be facilitated by a shorter boat: got her loaded before the evening with a view to set off early next morning. She made some water—found about bed time, that she had made a great deal of water; kept her baled all night. Thermom^r at 8^h p.m. 34° Extremes 40° — 72° .

Thermometer in air 24° in river water 53° Sunday 11th
Clear — calm. — Got the Barge hauled ashore
and caulked, which detained us untill the after-
noon;

1804 } noon ; got another good observation at noon,
 November } which gives the latitude $32^{\circ} 29' 30''.5$ that is
 $4\frac{1}{2}''$ less than yesterday, and as those two obser-
 vations were both very good, the mean of the two
 results may be taken for the truth, the latitude
 of the place of observation will therefore be 32°
 $29' 32''.75$ and as the post or Garrison lies $4\frac{1}{2}''$
 north of the place of observation, we may con-
 sider its latitude as fixed at $32^{\circ} 29' 37''.25$. Set
 out after dinner and made 3 miles, Encamped at
 the plantation of Baron Bastrop. It appears that
 this small settlement on the Washita & some of
 the Creeks falling into it contains only 500 per-
 sons of all ages & sexes ; it is reported that there
 is a great deal of excellent land upon several
 considerable Creeks falling into the Washita &
 that consequently the Settlement is capable of
 great extension, & may be expected, with an
 accession of population to become very flourish-
 ing : there are three merchants settled at the
 post, who supply the inhabitants at very exor-
 bitant prices with their necessities ; those with
 the garrison & two small planters and a trades-
 man or two constitute the present village : a
 great part of the inhabitants still continue the
 old practice of hunting during the winter sea-
 son ; their peltries go to the Merchant at a low
 rate in exchange for necessities ; in the summer
 these people content themselves with making
 corn barely sufficient for bread during the year ;
 in

in this manner they always remain extremely poor; some few who have conquered their habits of indolence (which are always a consequence of the indian mode of life) and addicted themselves to agriculture, live more comfortably & taste a little the sweets of civilized life. { 1804
November

Thermom! in air 36° — in river water 54° — Monday the 12th
Clear — Calm — Got on board some fresh beef and other provisions this morning, which detained us a little. Continued our voyage with a pilot on board hired at the rate of 30 dollars p^r month. Met with several shoals, but passed over them with ease, our Barge not drawing half the water of our own boat, & being also very light both in her timbers & planks; the appearance of the lands along the river is not very inviting, much pine woods upon a thin poor soil: to the right the settlements on the Bayou Barthelmi and Siard are said to be rich lands. At noon got an observation; Latitude $32^{\circ} 34' 47''$. Made this day 16 miles 32 perches. Therm! at 8^h p.m. 54° — This Evening a little Cloudy.

Thermom! in air 33° in river water 55° Fog Tuesday 13th
on the river. Calm. Continued our voyage without change in the appearance of the Country: passed an Island and strong rapid at 8^h a.m. & arrived at a little settlement where we halted to breakfast a little below a chain of rocks crossing
ing

1804 } ing the channel between an Island & the main-
 November } land called Roquerau — great misery depicted
 in the Countenances of the Spaniard & his
 family inhabiting this little settlement, arising
 as it appears from extreme indolence : the wind
 at south indicates rain, with a dark cloudy sky :
 we find our situation greatly improved in our
 new barge, being able to go about 3 miles p:
 hour when the Men use a little exertion : we
 pass without difficulty over shoals of 11 or 12
 inches water. The river acquires a more spacious
 appearance, being in most places about 150 yards
 wide. Lost some time on the shoals and at half
 an hour past noon arrived at the last settlements.
 Began to rain — put ashore to dine — cleared up
 — set out and passed the mouth of Bayou Bar-
 thelmi on the right at 4^h p.m. being 12 com-
 puted leagues from the post. Here commences
 Baron Bastrop's great grant of land from the
 Spanish Government, being a square of twelve
 leagues to each side ; a little exceeding one mil-
 lion of french acres, which I presume is more
 than double of what that Government granted
 to all persons within the Mississippi territory. —
 At 11^h a.m. passed Otter Bayou on the left. The
 Banks of the river continue to be about 30 feet
 high, of which 18 feet from the water are a
 clayey loam of a pale ash colour, upon which
 the river has deposited an alluvion of 12 feet of
 light sandy soil, which appears in most places
 to

to be fertile, being of a brownish dark color. { 1804
It seems that this species of land is here of small { November
breadth, not exceeding half a mile on each side,
& may be called the valley of the river Washita,
beyond which there is high land clothed chiefly
with pines.—The Evening is cloudy & dark.
Made this day 16 miles 312 perches—Ther-
mom^r at 8^h p.m. 62°—Extremes 33°–66°

Thermometer in air 44° in river water 55°—Wednesday 14th
Clear—calm. Continued our voyage, the soil
seems to be thin; the growth of the timber is
small. We made small progress, being opposed
by a head wind. Passed the 'Bayou des buttes' in
the forenoon; this Creek derives its name from
a vast number of Indian mounts discovered by
the hunters along its course: we were detained
an hour extraordinary at breakfast, from the
necessity of repairing the rudder irons damaged
going over a rocky flat. The margin of the river
is clothed with such timber as generally grows
on inundated lands, particularly a species of the
white oak called vulgarly the overcup-oak; its
timber is remarkably hard, solid, ponderous and
durable, and it produces a large acorn in very
great abundance upon which the Bear feeds;
it is also very fattening for Hogs.

At noon got a good observation & found the
latitude to be 32° 50' 8".5 — after dinner passed
a long narrow Island. The face of the Country
begins

1804 } begins to change; the banks are low and steep,
 November } and the river generally deeper and much contracted, being from 30 to 50 yards wide; this low Country is 2 or 3 leagues wide on each side of the river, liable to overflow 12 or 15 feet above the level of the land, the soil is a very sandy loam in the neighbourhood of the river, & covered by such vegetables as are found on the inundated lands of the Mississippi; in short this tract presents every appearance of a newly created soil, very different from what we passed below: it may be supposed that there existed a great Lake within the space now occupied by this alluvial tract, which may have been drained off by a natural Canal worn out by the abrasion of the waters, and that since that period, the annual inundations have been replenishing this space with the alluvion of its waters; 18 or 20 feet of soil perpendicular is yet wanting to render it a fit habitation for man; it appears never the less to be well peopled by the beasts of the forest, several of which presented themselves to view, but they must all retire to the high lands during the season of the inundation. We now begin to see quantities of water fowl which are not generally very numerous untill the cold rains and frost drive them to us from the northward. Fish is not so abundant in this river as might be expected; at the post we were informed that the river had been extremely full of fish untill the
 year

year 1799, when the waters of the inundation of the Mississippi dammed up the Washita river some distance above the Post and produced a stagnation and consequent corruption of the waters, which destroyed all the fish within the influence of this cause. The river continues to be contracted, seldom exceeding 60 yards and generally deep; no current is felt excepting in places a little shallower than the rest. — Thermometer at 8^h p.m. 44°. Extremes 44°–58° Clear.

Thermometer in air 38° in river water 54° — Thursday 15th
 Clouds — Calm. Continued our voyage thro' a Country of the same appearance as yesterday. Passed some rapids without difficulty — the banks still continue low; from ten to 15 feet above the present level of the river; the water marks on the trees from 15 to 20 feet. Landed to observe about 90 yards higher than the upper point of the Island of Mallet, judging that we were not far from Lat. 33° the division line between the territories of Orleans and Louisiana; we found the Latitude by a very good observation to be 32° 59' 27".5. The Island of Mallet is on the right of the main channel, and the place of observation being 90 yards N 45° E from the upper point of the Island. Making allowance for the breadth of the river (50 yards), Latitude 33° may be found from the above data when the Jurisdiction of the territories may require

1804 } require it, this Island of Mallet being very well
 November } known to the Hunters. Should time and circumstances permit on our return, a 2^d meridian altitude of the Sun may be taken and a proper mark set up in Lat : 33°—In general the bed of the river along this alluvial country is fully covered by water from bank to bank & the navigation good, but to day at 3^h p.m. we passed 3 contiguous sand-bars or beaches called 'les trois battures'; & at three & a half hours p.m. the 'bayou des grand Marais' (great Marsh Creek) on the right: passed also in the evening on the same side 'la Cypriere Chattelrau': a point of high land approaches within half a mile of the river on the right. Thermom^t at 8^h p.m. 50°—Extremes 33°–60°. Made this day 16 miles 42 perches. This days voyage was shortened by an indisposition which confined me to the tent untill the hour of breakfast.

Friday 16th. Thermom^t in air 38° in river water 54°—Cloudy—Calm. Set out at 6^h 58' and continued our voyage, the wind rises northerly against us, nevertheless we make 7½ perches p^r ½ min: whereas with our former boat we should not have exceeded 4 per: still however our improved progress is short of the velocity which a boat for our purpose ought to attain; it should not fall short of 12 per: p^r ½ min: which would be about 4½ miles p^r hour. No observation to day

day the weather being cloudy, damp and disagreeable. Between 11 & 12 o'clock passed on the right the 'marais de la Saline' (Salt-lick marsh) There is here a small marshy lake, but it is not intended by its name to convey any idea of a property of brackishness in the lake or marsh, but merely that it is contiguous to some of the licks, which are sometimes termed 'Saline' & sometimes 'glaise,' being generally found in compact clay which might serve for potter's ware; the bayou de la Tulipe forms a communication between the lake and the river: there is opposite to this place a point of high land forming a promontory and advancing within a mile of the river, to which boats resort when the low grounds are under water: a short league after, we came to the mouth of the grand bayou de la Saline (Salt-lick Creek) on the right; this is a creek of considerable length & tollerably good navigation for small boats, the Hunters ascend it to an extent of a hundred of their leagues in pursuing their game. They all agree that none of the springs which feed this Creek are salt; it has obtained its name from many buffalo salt licks which have been discovered near to the Creek. Altho' most of those licks by digging will furnish water holding in solution more or less marine salt, yet we have reason to believe that many of them would produce Nitre. We now begin to observe a stratum of a
dirty

{ 1804
November

1804 } dirty white colored clay under the alluvial soil;
November } this clay is similar to what we observed before
we entered the alluvial tract; we have therefore
reason to expect, that we are gradually emerg-
ing from this sunken tract & shall soon ascend
into the high land country. Made this day 17
miles 185 perches. In the evening it began to
rain. Thermom^r at 8^h p.m. 42°. Extremes 38°—
51°

Saturday 17th Thermom^r in air 40° in river water 54° —
fog on the river — calm — river risen 2½ inches
during the night.

Continued our voyage; the low lands are still
alluvial, at least to a certain depth; an under
stratum of clay appears in many places, where
the banks have been undermined & broken
down: we remarked that since we entered the
alluvial country about 32° 52' Lat: we have
seen no long moss (*Tilandsia*) altho' this low
damp country seems in all respects well adapted
to favor its production; upon enquiry of our
Pilot, he informs us, we shall see no more of
it; probably its limit of vegetation northerly
may be fixed by nature near to 33° Lat: Saw
a great quantity of the long-leaf pine, which is
frequently found in rich & even inundated lands
as is the case here; the short leaf or pitch pine
on the contrary is always found upon arid lands
& generally in sandy & lofty situations; but
our

our Country furnishes it in a hard meagre clay. { 1804
In the forenoon saw the first swan which was { November
shot by one of our hunters; it was a solitary
one whose mate had probably been killed: this
is the season when the poor inhabitants of the
settlement of the Washita turn out to make their
annual hunt; they carry no provision with them
but a little indian corn, depending on their guns
and ammunition for the rest. The Deer is now
fat & their skins in perfection; the Bear also is
now in his prime with regard to the quality
of his fur and the quantity of fat or oil which
he yields, he has been feeding luxuriously for
some time upon the autumnal fruits of the
forest, such as pirsimmons, grapes, pawpaws,
walnuts, packawns, hickory-nuts, chinquapins,
beech-mast, a great variety of acorns &c &c;
it is however well known (notwithstanding the
fancies of some writers) that the Bear does not
confine himself to vegetable food; the planters
have ample experience of his carnivorous dis-
position. He is particularly fond of Hog's flesh,
but no animal escapes him that he is able to
conquer: Sheep & Calves are frequently his prey
and he often destroys the fawn when he stum-
bles upon it; he cannot however discover it by
the sense of smelling notwithstanding the ex-
cellence of his scent; Nature has protected the
helpless young by denying it the property of
leaving any effluvium upon its tract, which pro-
perty

1804 } perty is so powerful in the old Deer : perhaps
 November } it may not be generally known to Naturalists,
 that between the hoofs of Deer &c is found a
 sac with its mouth inclining upwards ; this sac
 always contains more or less musk, which by es-
 caping over the opening in proportion as it is
 secreted, gives to the foot the property of leaving
 on the ground a scent wherever it passes : during
 the rutting season the musk is most abundant
 particularly in old males, which may often be
 smelt at a considerable distance by the hunters.

The Bear unlike to most other beasts of pray
 does not kill the animal immediately he has
 seized upon, but regardless of its struggles, cries
 and lamentations, fastens upon it and (if the ex-
 pression may be allowed) devours it alive : the
 taste of M^r Bruce & his Abyssinians may have
 been formed upon this excellent model. — The
 hunters count much of their profits from the
 oil drawn from the Bear's fat, which at New-
 Orleans is always of ready sale, and is much
 esteemed for its wholesomeness in cooking, be-
 ing preferred to butter or hog's lard ; it is found
 to keep longer than any other oil of the same
 nature, without turning rancid : they have a
 method of boiling it from time to time upon
 sweet-bay leaves which restores it or facilitates
 its conservation. At noon found our Latitude
 to be $33^{\circ} 13' 16''.5$. In the afternoon saw a small
 Aligator, which we did not expect in so north-
 ern

ern a situation ; passed a few rapids & saw cane brakes on both sides, the canes of a small size, { 1804
November
which demonstrates that the water does not surmount the bank above a few feet: the river widens & a number of sand-beaches are seen. Therm: at 8^h p.m. 44° — Extremes 40° — 41°. Made this day 15 miles 308 perches.

Therm: in air 32° — in river water 52° — Sunday 18th
Serene — Calm — river seems rather on the rise. Set out at 7^h 20' and continued our voyage; passed along a narrow passage this morning, about 70 feet wide; the whole of the water of the river runs thro' this passage; on the left the old channel of the usual breadth leaves an interval which becomes an Island when the water passes along the old bed of the river during freshes: Came up to a place at the hour of breakfast where there is an appearance of some clearing called 'Cache la Tulipe' (Tulip's hiding place) this is the name of a french hunter who concealed his property in this place. It continues to be a practize of both white and red hunters, to deposit their skins &c. often suspended to poles or laid over a pole placed upon two forked posts in sight of the river, untill their return from hunting; these deposits are considered as sacred and few examples exist of their being plundered.

The banks of the river have now the appearance of the high land soil, with a stratum of 3
or

1804 } or 4 feet of alluvion deposited thereon by the
November } river, this superstratum is greyish and very sandy
with a small admixture of loam, which indicates
the poverty of the mountains and uplands where
the sources of the river take their rise. At noon
we found our Latitude to be $33^{\circ} 17' 13''$ — In
the afternoon passed on the right, the entrance
of a bay, which within must form a great lake
during the inundation. We now see a consider-
able number of the long-leaf pine tree; the canes
along the bank have a better appearance being
much larger in size, this indicates a better or
more elevated soil: Canes subject to be inun-
dated, i. e. the land to be inundated 3, 4 or 5 feet,
are always small and tough; they grow much
finer where there is little or no inundation, pro-
vided the soil be rich & loose. Passed a high
hill (300 feet) on the left clothed with lofty
pine trees. Thermom^t at 8^h p.m. 57° cloudy
weather threatens rain. Made this day 18 miles
75 perches. Having been much indisposed for
some days past, the number of remarks are prob-
ably fewer than might have been made—I still
remain in the same situation.

Monday 19th Therm^t in air 54° —in river water 54° —
Cloudy—Calm—river at a stand. Set out at 6^h
56' and continued our voyage. The banks pre-
sent still more the appearance of the high land
soil, the under stratum being a pale yellowish
clay

clay and the alluvial soil of a dirty white sur-
 mounted by a thin covering of a brownish veg-
 etable earth: the trees begin to have a better
 appearance, growing to a considerable size and
 height, tho' much inferior to those of the allu-
 vial banks of the Mississippi: passed the 'bayou
 de hachis' on the left this morning; points of
 high land not subject to be overflowed frequently
 touch the river, the valley is said to be league or
 more in breadth on each side of the river: passed
 some pine hills on the left called 'Cote de Cham-
 pignole', the river has been narrow during the
 course of this day's voyage, not exceeding on the
 average from 50 to 60 yards. Thermometer at
 8^h p.m. 62° Extremes 54°-67° Made this day
 18 miles 120 perches.

{ 1804
 November

Therm: in air 59° in river water 54° — Cloudy Tuesday 20th
 — Calm. No change in the river. Set off at 6^h
 48' — The banks of the river appear to be higher
 and the river wider, we meet with a number of
 sand beaches and some rapids but good deep
 water between them. At 7½^h a.m. passed a
 creek which forms a deep ravine in the high
 lands and has been called 'Chemin Couvert' —
 a little past 8^h we ascended a rapid where the
 water was confined to a breadth of 40 yards, a
 little farther we had to quit the great channel on
 account of its shallowness and rapidity, & passed
 along a narrow channel 60 feet wide: without a
 guide

1804 } guide a Stranger would have taken this passage
November } for a Creek. Between 11 and 12^h saw an aligator, which surprised us much at this late season & so far north. The Banks (exclusive of the large timber) are covered by cane or thick underbrush, frequently so interwoven with thorns and briars, as to be impenetrable, untill the way is cut with an edge tool: we see also some species of timber not common below, such as Birch, Maple, holly & two kinds of timber to which no other name has yet been given but 'Bois du bord de l'eau' (water side wood). Pirsimmons and small black grapes are plenty in some situations; the first are often very large and excellent, the last a mixture of sweet and tart; those are also common on the Mississippi. The weather being cloudy we did not land to observe. In the afternoon observed some feruginous earth on the right: the margin is frequently fringed with a variety of plants & vines, of the latter several species of the convolvulus, which no doubt in their season ornament this river with their elegant flowers. Thermom^r at 8^h p.m. 54°. Extremes 54°-62°. Made this day 18 miles 308 perches.

Wednesday 21st Therm^r in air 43° in river water 54° — a little fog — calm. Set out & passed a hill and cliff 100 feet perpendicular crowned with lofty pines called 'Cote de Finn' (Finn's hill) a chain of high

high land continues some distance on the left ; { 1804
the cliff presents the appearance of an ash col- { November
ored clay ; passed a strong rapid, and a little farther a Creek on the right called Bayou d'Acassia (Locust Creek) : The river varies here from 80 to 100 yards wide ; we frequently see indications of iron along the banks and some thin strata of ore from $\frac{1}{2}$ inch to 3 inches thick, but no other metallic appearance, nor indeed any thing uncommon in the fossil kingdom ; a little cloudy this morning, but cleared up before noon & got ashore hastily at a steep inconvenient place among trees and brush, and had a tolerably good observation notwithstanding : Latitude found $33^{\circ} 29' 29''$. The day proves mild, warm and agreeable, which acted as a restorative to myself and others who had been indisposed for some days past : Therm: at 3^h p.m. 72° . Altho' Ducks, Geese and Turkeys are often seen, yet we cannot say they are in that abundance which from report we expected, and they are so shy, that we seldom can get a shot from our large boat ; but by sending the canoe a head some game is procured ; it is probable that higher up, we shall be more successful. Therm: at 8^h p.m. 58° — Extremes 43° — 72° Made this day 18 miles 36 perches.

Therm: in air 40° in river water 53° — Light Thursday 22^d
clouds — calm. — No change this morning in
the

1804 } the general appearance of the country, the tim-
 November } ber such as has been mentioned, with an in-
 creasing proportion of holly, birch, maple and
 beautiful pine-trees; at 10½^h a.m. came to the
 road of the Cadadoquis Indian Nation leading
 to the Arcansa Nation; a little beyond this is
 the Ecor à Fabri (Fabri's Cliffs) 80 to 100 feet
 high: it is reported that a line of demarkation
 run between the french and spanish provinces,
 when the former possessed Louisiana, crossed
 the river at this place; and it is said that Fabri
 a french-man & perhaps the supposed Engineer
 deposited lead near the cliff in the direction of
 the line: we could not however obtain any au-
 thenticated account of this matter, and it is not
 generally believed: a little farther is a smaller
 cliff called 'le petite cor à Fabri' (the little cliff
 of Fabri); those cliffs appear to be composed
 chiefly of ash-colored sand with a stratum of
 clay at the base, such as reigns all along under
 the banks of this river. The day being hazy and
 cloudy we made no observation for the Latitude
 at noon. In the afternoon we encountered a
 great many difficult rapids, the current of the
 river being frequently confined to a very small
 space, where the depth of water is but barely
 sufficient for the passage of the boat; the addi-
 tional rapidity of the current indicates that we
 are ascending into a higher country. The water
 of the river now becomes extremely clear and
 is

is equal to any in its very agreeable taste as a drinking water. The general breadth of the river to day has been about 80 yards, altho' in certain places not above one half of this quantity. We now find immense beaches of gravel and sand, over which the river passes, in the season of its floods with the rapidity of a torrent, carrying with it vast quantities of drift wood which are in many places piled up in prodigious masses, lying 20 feet above the present level of the water, and points out to us already the danger of ascending or descending this river in certain degrees of its floods: accidents nevertheless are rare with the canoes of the Country; ours is the first barge of so large a size that ever ascended this river: passed a very intricate rapid in the evening, which we could not get up untill we had carried a rope ashore. Encamped upon an elevated gravel beach: Therm: at 8^h p.m. 54° Extremes 40°—68° Made this day 14 miles 317 perches.*

This day an unlucky accident happened, which was very nigh being extremely serious. Doctor Hunter was employed in the cabin of the boat loading one of his pistols; he held it between his legs upon a bench with his head almost

* It must be expected that imperfections in our reckoning must arise from the retardments and difficulties met with on the rapids and shoals; compensations for lost time and rate of going are made at the moment when the best judgement can be formed.

over

1804 } over the muzzle : while in the act of ramming
November } down the ball, the pommel slipt from the bench
& the cock of the lock came with force against
it, which giving way discharged the pistol, the
rammer and ball passed thro' the fingers & thumb
of the right hand & also thro' the brim of the
hat within little more than an inch of the Doc-
tor's forehead ; his thumb & fingers were much
torn, but no bone was broken, the concussion of
the head was most severely felt: the bottom of a
new powder horn (not well secured) which lay
upon the table was forced outwards & the pow-
der partly spilt upon the table, which providen-
tially did not take fire altho' the wadding was
found smoking upon the table: the circum-
stance of the bottom of the powder-horn being
forced outwards, points out a curious effect of
the elastic power of the air, viz after sustaining
a considerable compression the returning vibra-
tion causes a partial rarefaction, & at the same
instant the common air confined within bodies
involved by the sphere of rarefaction, exerting
its spring to restore the equilibrium, forces out-
wards all obstacles not sufficiently secured to
resist its action. The Doctor's wounds were
dressed ; he suffered great pain and debility, but
after some repose felt better in the evening.

Friday 23^d Therm! in air 48° in river water 54° — light
clouds — calm. River upon the fall. Set off and
continued

continued our navigation thro' difficult passages; { 1804
the river is broken into a number of small streams { November
by Islands, short turning rapids, sunken logs,
shoals, bars, and every impediment to be expected
in our situation, and this continued at short in-
tervals during the whole of the day, so that our
courses and distances cannot be expected to be
perfect; every allowance which could be judged
necessary at the moment was made: I fortunately
obtained a good observation of the Sun's mer-
altitude in the interval of some shifting clouds:
Latitude deduced $33^{\circ} 41' 35''$. The banks of
the river as we ascend are less elevated, being
now only from 9 to 12 feet, and probably the
freshest surmount them some feet; we passed
a great number of high & low gravel and sand-
beaches; on those were to be seen fragments of
stone of all forms & of a great variety of col-
ors; some highly polished and rounded by fric-
tion, and may have belonged to the mountains,
rivers and oceans of a World, from the ruins of
which the Globe we inhabit may have been
formed. The banks of the river in this upper
Country suffer greatly from abrasion, one side
and sometimes both being broken down by every
flood. We saw nothing to day worth noticing,
no change being observable in the appearance of
the lands and timber along the hills and banks
of the river: we found on a gravel beach some
fragments of the same kind of matter we found
lower

1804 } lower down resembling pit-coal; it burns with-
 November } out blaze to a white ash, but will not consume
 (in common temperature) without other fuel :
 under the burning glass, it emits smoke & con-
 sumes, yielding a faint smell of sealing wax ; it is
 light and friable, & affords very little evidence of
 being penetrated by bituminous matter. Therm:
 at 8^h p.m. 54° Extremes 48°–72° Made 13 miles
 28 perches.

Saturday 24th Therm: in air 48° in river water 54° — light
 clouds — calm — river at a stand. Set off & con-
 tinued our voyage thro' a country in all respects
 similar to that thro' which we passed yesterday,
 excepting that our obstacles from strong rapids
 are considerably augmented : at a place on the
 left called 'Auges d'Arclon' (Arclon's troughs)
 we observed some laminated iron ore, and a stra-
 tum of tenacious black sand shining with minute
 chrystals. The general breadth of the river is
 now 80 yards, tho' in many places greatly en-
 larged by Islands & shallows, and at other places
 contracted to 80 or 100 feet. The river is now
 in many places rocky of a greyish color & rather
 friable. Observed some willow very different
 from what is found below and on the banks of
 the Mississippi, the last is very brittle, this on the
 contrary is extremely pliant & resembles the
 osier, of which it is probably a species, I propose
 on our return to take some plants along with us ;
 its

its foliage is now of a golden yellow & falling: { 1804
we also found some of the larger Whortle-berry { November
in fruit, the berry is of a Sub-acid agreeable taste,
the leaves not yet fallen of a beautiful crimson.

The weather being cloudy we had no observation at noon & went on to dine at the forks of the Washita and Missouri the lesser; the latter comes in from the left hand and is a considerable branch, perhaps about $\frac{1}{4}$ of the Washita: Hunters often ascend the little missouri, but they are not inclined to penetrate far up, because this branch reaches near to the great planes or prairies upon the red river, which are often visited by the lesser Osage Tribe settled on the river Arcansa: These last frequently carry war into the Cadadoquis tribe who are settled on the red river about W.S.W. from this place, and indeed they are reported not to spare any nation or people. They do not come upon the head waters of the Washita, because they are surrounded by a number of mountains or steep hills rising behind each other, and so extremely difficult to travel over, that those savages perceiving no desireable object, do not attempt to penetrate to the river, & it is supposed to be unknown to the nation: The Cadadoquis (or Cadaux as the french who are fond of abbreviations generally pronounce the word) may be considered as Spanish Indians; They boast, I am told with truth, that they never have imbrued their hands in the blood of a white Man:

1804 } Man : it is reported (perhaps falsely) that they
November } are excited to enmity by the Spanish officers at
Nacodoches against the Americans.

We are told there is a mine up the little Missouri, it is said that the stream runs over a bright splendid bed of mineral of a yellowish and whitish color, it is most probably martial pyrites: some 30 years ago, several of the inhabitants hunters worked upon this mine and sent a quantity of the ore to the Government at New Orleans, but they were prohibited from working any more. Therm^r at 3^h p.m. 59° Extremes 48°—72° Made this day by a very uncertain reckoning 11 miles 152 Perches.

Sunday 25th This morning proved very rainy, having commenced raining before day, we were therefore constrained to continue encamped: a cessation took place after breakfast, which gave us some hopes of being able to proceed, but this was not of long duration; the rain recommenced and we remained all day in our tents. We have the consolation however to expect that the river will rise a little in consequence of the rain, which will facilitate our ascent over the shoals that are to be expected above. Therm^r at 8^h p.m. 62° Extremes 54°—70°

Monday 26th Therm^r 50°—river water 57°—clear above. Calm—river risen 3½ inches in the night. Contrary

trary to expectation the morning proved not only fine and serene, but of a mild, agreeable temperature. In general after the winter season sets in, the changes in the weather are made by extremes. A day or two of rain is commonly succeeded by a cold and blowing north wester, and the day following a frost of some severity, which has not been the course upon this last occasion, it appears also that the rain has raised the temperature of the river 3°. The water is now remarkably clear and fine, and it does not seem to have been discoloured by the last rain. There is still a great sameness in the appearance of the river banks, the Islands are skirted with osier, and immediately within on the bank grows a range of birch trees & some willows; the more elevated banks of the River are clothed by a thick growth of Cane & the timber which rises above the Cane is such as has been already mentioned Viz. oak, white, black, and red; many species of each: black Maple, white maple, Sycamore, Elm several species, Ash, hicory many species. Dog wood, Holly, Iron wood &c—

Saw a number of yellow butterflies fluttering about the banks of the River. We continue to encounter the same obstacles from the shoals & rapids; the valley of the river, in its present low state is filled with Islands, which dividing the current reduces the depth of the Channel; We find no great difficulty where the water is collected

{ 1804
November

1804 } lected into a single channel. Our Pilot informs
November } us that there is a body of excellent land upon the
little Missouri & more especially on the Creek
called the 'Bayou à terre noire,' which falls into
the little Missouri; this land reaches within a
few miles of the Washita, and is said to extend
to the Red River being connected with the great
prairies above the Cadaux nation & in the prox-
imity of the red River: this rich tract of Coun-
try is said to be of very considerable extent per-
haps a square of 30 miles & is connected with
the great prairies which are the hunting grounds
of the Cadaux Nation, consisting of about 200
warriors, they are warlike, but frequently unable
to defend themselves against the tribe of Osages
who are settled upon the Arcansa river, who pass-
ing round the mountains which give birth to the
Washita, along the prairies which enclose those
mountains on the West and seperate them from
the main Chain of mountains which furnish the
waters of the red & arcansa river, pass down in
the Cadaux Country & rob & plunder them of
their horses and other effects, & not unfrequently
take a few scalps; for it seems that this detached
tribe of the Osages is a lawless gang of robbers,
making war with the whole world.

Therm^r at 8^h p.m. 62°—Extremes 50°—68°
Made 12 miles 21 Perches.

Tuesday 27th Therm^r 54° — river water 58° — Cloudy —
River

River risen above the mark which was 12 inches out of water: set off at 7^h 1'. and continued our Voyage with the same obstacles from rapids, which were very violent at particular points from the encreased body of water descending from the higher position; but we obtained at the same time the advantage of approaching the willows & even passing thro' them, to avoid the most difficult passes. During the hour of breakfast the river rose $1\frac{1}{2}$ inches perpendicular. The general height of the main banks is now from 6 to 12 feet above the level of the water, and the land is rather of a better quality, the Canes &c shewing a more luxuriant vegetation: the superficial soil subject to inundation is of brownish appearance greatly mixed with Sand; At noon arrived at 'cache à Maçon' (Masons hiding place) on the right, stopped here for dinner. Having been informed of some pit coal reported to be in the neighbourhood, we determined to explore its position. Doctor Hunter with the Pilot set out for this purpose, & at about $1\frac{1}{2}$ mile N.W. of the Boat found in the bed of a Creek a substance similar to what we had formerly seen under the name of coal; some pieces of it were very black, solid, & of a homogenous appearance greatly resembling pit Coal, but it was deficient in ponderosity, & did not seem to be penetrated by bituminous matter in a sufficient degree to constitute Coal; We may perhaps therefore be permitted

{ 1804
November

1804 }
 November } mitted to consider it as vegetable matter in a certain stage of its progress of transmutation into Coal, we were the more confirmed in this opinion by discovering other fragments, which still retained very evidently the fibrous texture of wood, one peice in particular seemed to have been a large chip taken out by the felling ax. Those last pieces were not so far advanced in the transmuting progress as the first mentioned; although black it was not so perfect, being rather a very dark brown black, retaining the exact form & shape of the wood as it had been separated from the log: as this incipient or imperfect Coal was found imbedded among clay & gravel, which appeared to have been washed down by the torrent, no clue could be found to lead to a discovery of the process by which nature effects so extraordinary a change, an ingenious enquirer placed in favorable circumstances, will probably have the good fortune to make this discovery: The time may arrive when the Planter who shall be clearing his Plantation or farm of useless timber, will be enabled from the instructions of the Chemist to place the whole in a situation to be transmuted into an usefull article capable of long preservation. This is no doubt the Carbonated wood described by Kirwan & other Chemists. We found along the banks a species of the white thorn loaded with abundance of ripe fruit, being a small oval berry of a cornelian colour

colour & agreeable sweetish taste ; the whortle berry was also found in the same situation. The white maple has now a beautiful appearance, its leaves before their fall first assume a pale yellow, but this soon fades, and they change into a splendid white and present at some distance the appearance of clusters of elegant flowers. Being cloudy at noon we made no observation for the Latitude.

{ 1804
November

We suppose the river to have risen at least 30 inches and it now flows with great rapidity, which obliges us to pass sometimes among the willows to avoid its impetuosity : this afternoon we passed some reaches of the river, which were very handsome, being of considerable length, and at least 150 yards wide, and flowing with a full current from bank to bank. We found a considerable number of unknown (to us) plants some of them very handsome, but our very limited knowledge in practical botany, did not enable us to discover what they were, particularly as they were not in flower. Made this day 13 miles 39 perches. Therm: at 8^h p.m. 66° Extremes 54°-71°

Therm: 68° — river water 60° fallen 4 inches Wednesday 28th
in the night — Cloudy — calm. Set off at 7^h 5' and continued our voyage, meeting the same species of obstacles as yesterday — the river appears to increase in width being sometimes 170 yards

1804 } yards broad, flowing at this time with a full tide
 November } from shore to shore. The Current is in some places
 extremely rapid, that is where the depth of the
 Channel is diminished and the bed contracted,
 in such situations we are under the necessity of
 catching hold of the willows &c, & hauling up
 along shore, oars and poles being insufficient to
 stem the violence of the torrent ; in other situ-
 ations for miles together the current is incon-
 siderable, in fact it is nothing under the shelter
 of the points, this advantage is the result of the
 enlargement and encreased depth of the river.
 Being cloudy we had no observation for the Lat-
 itude. Some of our people who walked out with
 their guns at the hour of dinner discovered some
 buffalo tracts we are therefore in hopes soon of
 getting some fresh beef. We past some beautifull
 Pine Forests. The Lands in many places appeared
 of a pretty good quality producing trees and a
 variety of vegetable subjects indicating a good
 soil. Encamped in the evening after making by
 our reckoning 12 miles 255 perches. Here we
 found an old dutch Hunter with his party con-
 sisting in all of 5 persons. This man has resided
 40 years on the Washita and before that period
 has been up the arcansa river, the white river and
 the river St. Francis ; the two last he informed
 us are small rivers of difficult navigation similar
 to that we are now upon, but the Arcansa river
 is a river of great magnitude, a large and broad
 channel,

channel, and when the river is low with long and great sand beaches like to the mississippi. So far as he has been up, the navigation is safe and commodious, without any impediment from rapids or shoals, upon all those rivers, the soil is of the first rate quality, the countries are of easy access, being lofty open forests, unembarrassed by canes & other under growth : the lands on the Arcansa are generally level and not subject to inundation, with here and there gently rising hills. The river is not embarrassed with rocks so far as this informant has ascended, but its bed is composed of mud and sand : the water of the river is extremely bad to drink, being of a disagreeable red colour and very brackish when low, a multitude of creeks which flow into the river furnish sweet water, which the voyager is obliged to carry in vessels on board to supply his immediate wants, hence this inconvenience is not of much moment. This man confirms the frequent reports given of silver being abundant up this river ; he has not been so high as to see it himself, but says he has received a silver pin from a hunter who assured him that he himself collected the virgin silver from the rock, out of which he made the Epinglete by hammering it out ; The tribe of Ozages live higher up than this position, but the hunters rarely go so high, being affraid of those savages who are at war with the world and destroy all strangers they can meet

{ 1804
November

1804 } meet with. It is reported that the arcansa nation
November } with a part of the Chactaws, Chicasaws, Shaw-
nese &c. have formed a league and are actually
gone or going 800 strong against those depre-
dators, with a view to destroy or drive them en-
tirely off and possess themselves of their fine prai-
ries which are most abundant hunting grounds,
being plentifully stocked in Buffalo, Elk, Deer,
Bear and every other beast of the chase, common
to those Latitudes in America. Our old Dutch
Hunter informs us of a saline or salt spring from
which he has frequently supplied himself with
salt by evaporation, we shall visit it in the morn-
ing, being only half a league distant. Made 12
miles 255 perches. Therm! at 8. p.m. 73° Ex-
tremes 68°-78°

Thursday 29 Therm! 72° river water 62°—Cloudy—wind
South, blew strong all night—This morning
Doctor Hunter went with a party and the old
dutch hunter to visit the saline, which was found
in the bottom of the bed of a dry gully near a
Creek ; after digging a few feet found the water
which proved very brackish to the taste ; the
saline lies about 1 ¼ mile northerly from our
encampment, a creek falls into the river a little
above our encampment, being the same which
communicates with the saline, a quantity of the
water was brought into camp whose specific grav-
ity was carefully ascertained by comparison with
the

the river water and found to be as 1.02116+ to 1. { 1804
November
Evaporated 10 quarts of the water which produced a saline mass weighing when dry 8 ounces. It began to rain about 9^h a.m. which obliged us to remain in camp untill after dinner, when it cleared up, and we set out at 1^h 27' p.m., the water of the river has now become whitish and less transparent in consequence of the rain and appears to be rising again altho' it seemed to have stopped since last night: the water was tolerably favorable in the afternoon having met with only one rapid of difficulty and considerable length: since we have had so much difficulty to encounter from the shoals and violence of the current, the Soldiers have exerted themselves with a considerable degree of vigor and perseverance and seem desirous that we should accomplish the end of our voyage. Therm: at 8^h p.m. 52°. Extremes 52°-76°. Made this day 8 miles 2 perches. The weather clears up and begins to grow cold, we expect a north-wester in the morning.

Therm: in air 38° in river water 60° — river Friday 30th risen 19 inches — clear calm. Set off & continued our voyage against a strong current during the greatest part of the day, altho' frequently we found favorable eddies or little or no Current where the bed of the river became enlarged, which sometimes extended to 150 and even 170 yards

1804 } yards in breadth. Saw great flocks of Turkeys
 November } to day, two of which were killed. At 10½^h a.m.
 arrived at the large branch on the left called
 'Fourche des Cadaux' (Cadadoquis fork) about
 100 yards wide at its entrance into the Washita;
 immediately beyond which on the same side the
 land is considerable elevated (ab^t 300 feet.) The
 wind from North and N.W. opposed us most of
 the day, so that our progress was not very rapid.
 At noon landed & observed the Sun's altitude
 in a difficult place, in some measure thro' the
 branches of trees, the Latitude deduced was 34°
 11' 37". As we advance to the north we per-
 ceive more of the effects of winter; the trees
 are now nearly stripped of their foliage, which
 a week below seemed to be nearly entire, altho'
 changed in color: Being informed of a saline or
 salt-lick, we landed before 3^h p.m. and the Doc-
 tor with a party went to view it, therm^t at 3^h 57°
 The Doctor returned in the evening with a quan-
 tity of water from the saline, which from taste
 appeared to be less impregnated than the former,
 and on trial its specific gravity was found to be
 when compared with the river water, which at
 that time was principally rain water, 1.017647.
 This salt pit was found in a low flat place subject
 to be overflowed from the river, it was wet and
 muddy, the earth on the surface yellowish, but
 on digging into the stratum which yielded the
 salt water, it was found to be a bluish clay; prob-
 ably

ably the water was fresher in consequence of the rain of the day before, which had not fallen when the first water was collected. Ten quarts of this last water produced by evaporation six ounces of a saline mass, which from taste was principally marine salt, it was however evident that it contained besides marine salt, some soda and a bitter salt, which last no doubt was muriated magnesia, but the marine salt greatly predominated. Made 7 miles 28 perches.

Therm^t in air 32° in river water 54° Clear — calm — river fallen 18 inches. The morning was cold & damp; we passed a considerable Island on the right about $\frac{3}{4}$ of a mile in length, called 'Isle du bayou des roches' (rocky creek Island) — we were greatly impeded this day by rapids, it was with much difficulty, some hazard, & great exertion of the men, that we ascended some of the rapids: we passed several points of high land full of rocks and stones, much harder and more solid than we have yet seen; the rocks were all silicious, and we began to observe, that their fissures were penetrated by sparry matter: indications of iron were frequent, & even fragments of poor ore, but no rich ores of that or any other mettall have presented themselves to view. Some of the hills appear to be well adapted to the cultivation of the vine, the soil being a sandy loam with a considerable proportion of gravel & stone
and

1804 } and a superficial covering of good vegetable black
 December } earth: the natural productions were sufficiently
 luxuriant, consisting of several varieties of oak,
 Pine, Dogwood, Holly &c with a scattering un-
 derwood of Whortleberry, Hawthorn, China-
 briar and a variety of small vines. It is probable
 that a skilful Vigneron, who shall undertake the
 establishment of a Vineyard in a well-chosen po-
 sition in this neighbourhood, will find his labors
 amply compensated; the market of New Orleans
 is at hand, where his wines (if good) may be
 immediately sold and paid for at a high price.
 At noon we were detained upon a very bad rapid
 & shoal, by which we lost the opportunity of
 making a meridian observation: In the evening
 also we landed a little earlier than usual at the
 foot of a long and difficult rapid, which we did
 not think it prudent to encounter so late, from
 the danger of getting fast upon it all night: we
 are now encamped upon the declivity of one of
 those hills about 150 feet high, commanding a
 fine prospect both up and down the river, & will
 at a future day become a rich Vineyard. Therm:
 at 8^h p.m. 35°. Extremes 32°—58°. Made this day
 7 miles 148 perches.

Sunday 2^d Therm: in air 30° in river water 50°. Clear—
 calm—river fallen 4 inches. Continued our voy-
 age and passed over a series of strong rapids, which
 opposed us untill the hour of breakfast. The
 Country

Country appears now to wear a new aspect ; high
lands and rocks frequently approach the river ;
the rocks are extremely hard, and altho' the
grain resembles that of free-stone, yet the stone
is hard enough to be used for the purpose of
hand-mill stones, to which object it has been
applied ; the river beaches also exhibit a great
variety of fragments of flint and other stone of
the most solid kinds ; the quality of the land
seems to improve, the superficial stratum of
Vegetable earth being of considerable thickness
(from 6 to 12 inches) and of a dark brown color
mixed with loam and some sand ; at 2½^h p.m.
passed a rock on the margin of the river consist-
ing of blue slate, which we shall probably find
time to examine on our way down ; more of the
same is to be seen higher up. About a league
from the river a little above the slate quarry is
a considerable plane called 'prairie de Cham-
pignole,' often frequented by Buffalo ; some salt
licks are to be found near it, and in many situa-
tions on both sides of this river at small distances
from it, we are informed that Salines or salt-licks
exist which may be rendered very productive ;
when this river comes to be settled, so necessary
an article as marine salt will therefore be in suf-
ficient abundance for the consumption of a full
population. We are greatly impeded today by
rapids and were unable to get ourselves landed
in a situation favorable enough to make an ob-
servation

{ 1804
December

1804 }
 December } servation for the Latitude before it was too late.
 We encamped just below some rapids which we are to encounter in the morning, upon excellent level and rich land, being almost entirely an Oak forest; it is not improbable that this land is sometimes subject to inundation, having the appearance of alluvial Land which has acquired permanency & stability, it is now at least 20 feet above the level of the river water. Therm: at 8^h p.m. 38° Extremes 30°-59°.

Monday 3^d Therm: in air 38° — in river water 48° — clear — calm — river fallen 8 inches. Continued our voyage with favorable water until breakfast, after which we encountered a great many very bad rapids during the remainder of the day; some were so difficult, that it was impossible to ascend without sending the greatest part of our people ashore with a good rope, & sometimes they were obliged to walk in the water; the exertions of the Soldiers on some very difficult and trying occasions were equal to every thing which could be expected, and exceeded greatly my expectations: at noon we had a good observation about 4 miles below the 'Chutes' (falls) Latitude deduced 34° 21' 25".5 we were now anxious to see the famous Chutes, which it was supposed at the Post, we should never be able to pass with so large a boat. The land on either hand continues to improve in quality; there appears to be in
 general

general a superficial stratum of good earth of a { 1804
dark brown color, upon which vegetation is suf- { December
ficiently luxuriant; hills frequently arose out of
the level country, full of rocks & stones, gen-
erally of an extremely hard flinty kind, often
resembling the Turkey oil stone, of this kind
was a promontory which came in from the right
hand, a little before we arrived at the Chutes :
this promontory presented some appearance at
a distance, of the ancient ruined fortifications
& Castles so frequent in Europe, the effect was
greatly heightened by a flock of swans which
had taken their stations under the Walls which
rose out of the Water; as we approached the
Birds floated about magestically upon the glassy
surface, and in tremulous melancholy accents
seemed to consult each other upon measures of
safety, the ensemble produced a truly sublime
picture: several masses of the same hard rock
insulated by the river conveyed the idea of
redoubts and out-works; we expect to visit this
place in our descent. A little after 4^h p.m. we
arrived at the Chutes. We found these falls to
be occasioned by a chain of rocks of the same
hard nature with those we had just seen below,
here they extended quite across the river, the
water making its way over the chain thro' a
number of breaches, which by the impetuosity
of the torrent had been worn out of the rock :
this chain seemed to proceed from a lofty rocky
hill

1804 } hill on the left side the appearance of which con-
 December } veyed the idea, of its having been cut down by
 the abrasion of the waters to its present level: the
 various breaches thro' which the water poured,
 were so many cascades, thro' one of which it
 was necessary to pass; otherwise the Barge must
 remain below the Chutes: it was quite uncer-
 tain which of the Cataracts ought to be pre-
 ferred; it was also doubtful whether our barge
 (9 feet wide) could find sufficient breadth &
 depth of water clear of pointed rocks to pass over
 the Chutes. We came up to the rocks & stoped
 between two of the Cascades, & sent a couple
 of Men with a small Canoe, who crept along
 shore & got above the Falls, they made fast a rope
 to a tree, and letting themselves gradually down
 by the same rope, came on board in great safety;
 having now got a number of hands ready to haul
 in upon the rope, we employed the remainder
 with poles to give a proper position to the Barge
 & to guide her into the best passage; we accord-
 ingly entered one of the Cascades, but after many
 fruitless attempts we found there was a defi-
 ciency of water; with some pointed rocks which
 opposed our passage; we therefore dropped down
 a little way, and moved laterally by poling to a
 second Cataract much more considerable than
 the one we had just attempted: the rolling im-
 petuosity of the water is not easy to describe,
 above and below the fall there was a rapid descent,
 but

but just at the fall there seemed to be a step of nearly one foot perpendicular ; difficult & dangerous as this place appeared for a frail bark like ours, we were determined to make the attempt & we lost no time in entering the strait, in which our Barge soon stuck fast at the bows, we then concluded it would be impossible to pass; it seemed that an inch or two were just wanting to our success; we however continued our efforts by moving from side to side by the stern, while great efforts were making upon the rope; we perceived a small advancement by every new exertion, our hopes revived, the Barge was in this manner forced half way thro' the Cascade, & now she seemed so completely wedged into the narrow passage, that every effort to stir her in any direction proved ineffectual; the water tho' extremely rapid was not deep & we got four of our boldest men into the water at her bows, as far as possible from the suction of the fall, who by feeling for rocks on which she rested, & raising her sides with all their might, enabled us to advance a step or two farther, beyond which it seemed impossible to move: it was now night, the stars were visible, the water was cold, and altho' the weather was not freezing, it was far from being mild, the therm: being at 45°; we now repented that we had made the attempt to pass so late in the evening, & wished we had delayed until the morning; at the same time the
river

{ 1804
December

1804 } river was falling, & it seemed not proper to defer
 December } the attempt, lest we should not get above the
 Chutes until another swell of the river : in this
 situation we determined to lighten the Barge, by
 sending all the men, except four, ashore to haul
 upon the rope, while the 4 who remained were
 with hand levers to endeavour to raise up &
 lighten the bows of the vessel: the first man who
 went out discovered, that by the violence of our
 exertions the rope was beginning to give way &
 that one of the three strands of which the rope
 was composed, had actually parted; we were now
 in a perilous situation, for if the rope had sep-
 arated, no force on board could have prevented
 our being dashed to pieces upon the rocks: we
 immediately ordered every man on board to his
 pole to support the boat; in the mean time a man
 was dispatched thro' the water with the end of
 a rope from on board, which being made fast to
 the same tree, we were again placed in a state of
 security; we now sent the other men on shore
 as had been intended, who gaining a firm footing
 and exerting themselves with great vigor soon
 extricated us and drew us safely ashore, greatly
 rejoicing to find ourselves without accident above
 the 'Chutes': we are encamped under the inces-
 sant roar of the cataracts, which resembles no-
 thing so much that I have heretofore witnessed,
 as the horrid din of a hurricane at New Orleans
 in the year 1779: the course of the chain of
 rocks

rocks across the river is nearly S.W. and N.E. { 1804
 —Made this day 7 miles 218 perches—Therm: { December
 at 8^h p.m. 44°—Extremes 38°–59°

Thermom: in air 36° in river water 48° — Tuesday 4th
 clear — calm — river fallen 2 inches. Immediately above the Chutes, the water possesses little or no Current, owing no doubt to its depth & breadth & we went on without opposition untill after breakfast; about 8^h a.m. passed a ledge of very hard freestone rocks with moderate current: this reach is spacious being not less than 200 yards wide & is terminated by a high rocky hill (about 350 feet perpendicular) crowned with beautiful pine woods, a fine situation for building: at 10½^h passed a bald hill on the left being chiefly uncovered rock, and arrived at the foot of a most tremendous rapid full of breakers, the passage being studded with pointed rocks of all magnitudes, which raising their rough heads above water, seemed to threaten with destruction the unwary voyager who should presume to attempt their passage; this place appeared to me much more difficult and dangerous than the Chutes, the water descended along a plane of considerable inclination with a most impetuous velocity, the spray & white foam dashing over the rocks, occasioned a very perceptible mist or vapor which spread about at a small elevation, it is probable it might ascend into the atmosphere

1804 }
 December } phere at a higher temperature. We stopped to
 contemplate this embarrasment & ordered out
 a rope, which was carried along shore by a cer-
 tain part of the people, the rest using their poles
 on board; we made many fruitless essays to pass
 upwards by several openings near the shore; at
 length we attempted the center of the Cataract
 where the current was the most violent, but the
 water deeper, & by very great exertions we got
 over into moderate water, having consumed $1\frac{1}{4}$
 hour in making about $\frac{1}{2}$ mile; 300 yards of
 this distance is difficult & perilous, the greatest
 prudence with unceasing exertion being indis-
 pensibly necessary to the safety of such a barge
 as ours. We landed above this rapid & by a
 good observation found the latitude to be 34°
 $25' 48''$; on our right stood a high rocky hill
 crowned with very handsome Pine-woods; the
 strata of this rock were inclined 30° to the Ho-
 rizon in the direction of the river descending;
 this hill may be from 300 to 350 feet high: we
 have now frequently the hills touching the river
 on both sides; a border or list of green Cane
 skirts the margin of the river, growing out of
 the alluvial soil, beyond is generally a high &
 sometimes barren hill. At 2^h p.m. we passed a
 hill on the left containing a great body of blue
 slate, in some places hanging over the river; a
 little farther came to another rapid or cataract,
 which appeared if possible more terrible than
 the

the last, the descent of the water was extremely precipitate; from the very irregularly undulating surface, it was evident that the bottom was composed of innumerable fragments of rock, many of which just shewed their heads out of water; we halted on the right shore & sent up our rope, but after many fruitless & some dangerous attempts, in which we were always repelled by the rocks, we were obliged to give up the expectation of passing up on that shore; we therefore had recourse to the expedient of swinging the barge into the middle of the river & by the aid of the rudder and the exertions of poling, we with some difficulty got hold on the opposite shore, notwithstanding that the rope was caught under a rock in the middle of the river. We hauled the rope on board and sent it up the shore, and passed up the most violent part of the rapid: we ascended a second rapid of less importance and encamped, our people being almost exhausted with fatigue; on the right is a creek called 'bayou de la saline'; about a league up the Creek is a salt-lick, which by digging yields salt water resembling what we have already seen; there is also blue slate near the same situation. This afternoon our hunters shot twice at a Buffalo & wounded him severely, the blood flowing as he run, but he escaped. Our tents were pitched on a stony and gravelly beach, they were completely paved with stones of a great

1804 } great variety in kind, color and size. Therm: at
December } 8^h p.m. 36° — Extremes 36°–50° Made only 4
miles 164 perches.

Wednesday 5th Therm: in air 23° in water of the river 47°
— very serene — calm — river fallen 2 inches.
The morning tho' cold was agreeable, the air
being very dry : all night we hear'd the roaring
of a Cataract, which we were to encounter this
morning ; we were presently at the foot of it ;
the violence of the rapid was about 100 yards
in length, & as I sat in the cabin of the barge
with my eye lowered to the level of the still
water of the reach above the rapid, I found
there was a fall of 4½ feet ; we sent our rope a
head as usual ; but made very little progress for
some time, the rope being entangled among
sharp rocks which endangered its cutting, the
consequence of which might have been fatal to
all on board the barge, with the entire destruc-
tion of the boat and every thing contained in
it ; the passage was full of breakers and studded
all over with pointed rocks, so that it was neces-
sary to guide with the utmost care, to be able
to pass clear of those unfriendly obstacles : the
men on shore exerted themselves greatly, but
were frequently obliged to rest, & the boat was
often at an entire stand, at length the rope
escaped from the rock which bent it out of its
course, and we began to move up very slowly,
frequent

frequent rests were necessary & in about an hour and a half we ascended above the rapid which was only about 150 yards in length; a small island here divided the river into two channels, we took the shortest tho' the most rapid, because it was most favorable for the use of the rope: The french hunters have denominated this place 'La Cascade' on account of the rapidity & great fall of the water within so small a space: below the Cascade, we had rocky hills on both sides, the quality very hard freestone, but that found in the bed of the river which was rolled down by the floods from the upper countries, was very frequently of the hardest flint, sometimes resembling the Turkey stone. Being embarrassed upon the rapids we could not land to observe at noon. We were obliged to use the rope a second time to ascend a very impetuous rapid, altho' much inferior to that of the morning: at 1^h 45' p.m. passed a creek on the right called 'fourche au Tigre' (Tiger creek) 4 computed leagues from the Chutes; it would seem that the Early Hunters have calculated their leagues by the time required to ascend the stream, & not by distance, as it appears from our calculation, that the distances passed over are frequently not above half those by computation: we now carry the rocky hills with us very often on both sides; rich bottoms nevertheless are not infrequent, & the upland is sometimes of moderate elevation

{ 1804
December

1804 }
December } tion & tollerably level : we are informed that up
the fourche au Tigre, & other Creeks there are
many extensive tracts of rich level land. The
stones and rocks we now meet with are chiefly
penetrated along their fissures by sparry and
chrystaline matter. Last night a band of Wolves
howled in our neighbourhood a great part of
the night. Turkeys become now much more
abundant & less difficult of approach than be-
low, our hunters generally kill some every day.
The opposition on the river was to day so great,
that we made only 3 miles 128 perches, altho'
by the old computation our days voyage was
little short of 3 leagues. Therm^r at 8^h p.m. 38°
Extremes 23°—56°

Thursday 6th Therm^r in air 45° in river water 48°—cloudy
—light wind at S.W. river fallen 2 inches. We
were encamped last night upon excellent land,
tollerably level, and of a good dark brown or
blackish soil at the surface, about 12 inches
deep, lying upon a yellowish loam ; the growth
of timber is large and handsome, chiefly a forest
of Oak with an admixture of ash, hickory, elm
&c, a field of corn has been formerly cultivated
here by one of the hunters during the summer
recess from hunting. This morning the Weather
being cloudy we apprehended rain, but hoped to
reach the 'fourche of Calfat' (Caulker's creek)
the point which is to terminate our navigation,
&c

& encamp before bad weather ; we accordingly proceeded on without material interruption { 1804
December
until the hour of breakfast, carrying with us high hills on the left and good level lands on the right, subject perhaps to be inundated : at 9^h a.m. arrived at the foot of a very long precipitous rapid, it seemed to be divided into four steps, one of which was at least 15 inches perpendicular exclusive of the inclined plane above and below, the whole could not be less than 5½ feet perpendicular from the beginning to the end, which was about 400 yards, altho' the swift water continued half a mile : the rope was carried along the bank as usual, and many stops were made upon the rocks before coming to the great fall ; at last the barge entered between two high rocks, the men exerted themselves vigorously both on shore and aboard ; the barge appeared to be ascending an inclined plane of 12 or 15 degrees ; great exertions were necessary, she however passed without touching any other obstacle but the impetuous torrent and in a few seconds was drawn into moderate water to the infinite joy of the whole party ; upon another part of the rapid higher up, we got upon a rock, which seemed to serve as a pivot, upon which the boat turned as a Center ; after reiterated exertions, we could neither advance nor retreat, we therefore unloaded about one quarter of the cargo which enabled her to pass
up

1804 } up without difficulty: we immediately re-loaded
 December } having spent three hours in getting over this
 rapid, and proceeded a quarter of a mile farther
 to Ellis' Camp a little below the 'fourche au
 Calfat' (Caulker's creek): Here terminates our
 voyage upon the river upwards, for the pre-
 sent. Our pilot considers this the most conven-
 ient landing, from whence to transport by land
 our necessary baggage to the hot-springs, the
 distance being about three leagues. There is a
 creek about 2 leagues higher up, called 'bayou
 des sources chaudes' (hot-spring Creek) upon
 the banks of which the hot springs are situated,
 about 2 leagues only from its mouth, but the
 road is very hilly and therefore less eligible than
 the path from this camp or landing, which is
 almost a level road. Upon ascending the hill to
 encamp we found the land extremely level and
 very good, with some plants in flower & a great
 many evergreen vines; the forest is chiefly oak
 with an admixture of other timber as before
 mentioned: soon after we arrived it began to
 rain, we were however tented before it com-
 menced. Therm: at 8^h p.m. 56°. Extremes 54°-
 67°. Our short voyage this day was only 2 miles
 32 perches.

Friday 7th Therm: before sun-rise 38° in river water 47°
 Cloudy — Wind N.W. river risen 4 inches. In
 the morning Doctor Hunter with the Pilot &c
 went

went to view a salt-lick about a mile to the West of our camp but found no salt water ; the clay was extremely stiff and difficult to dig : after breakfast dispatched the Pilot with the greatest part of our people with their own baggage & some provisions to encamp at the hot-springs, hoping to find Cabins there sufficient to hut our party with orders to return early next morning so as to take out a load of more baggage and instruments. Took the sun's meridian altitude ; Latitude deduced $34^{\circ} 27' 31''.5$ — Therm' at 3^h p.m. 50° — the weather cleared up about 9^h p.m. and became very serene and cool with wind at N.W. some venison and turkey were procured by the hunters : altho' we have frequently seen the tracks and other marks of buffalo, we are hitherto disappointed in killing any of them.

Therm' in air 10° in river water 43° — very Saturday 8^a serene—light wind at N.W. river risen 4 inches. We found the weather this morning extremely cold, the therm' having fallen lower, than we expected in this latitude, particularly at the present early period of the winter season ; it is perhaps to be ascribed to the elevation of the country and neighbourhood of mountains : as we have no barometer with us to indicate the pressure of the atmosphere, we shall when we get to the hot springs, ascertain the degree of the

1804 } the thermometer at which water boils, from
December } which scientific men may draw their own conclusions respecting the elevation of the land.

At 10^h a.m. our people returned from the hot-springs, each giving his own account of the wonderful things he had seen: they were unable to keep the finger a moment in the Water as it issued from the rock, they drank of it after cooling a little and found it very agreeable; some of them thinking that it tasted like Spice-wood tea. The people after refreshment were dispatched with another load of necessary baggage.

Took the Sun's meridian altitude again to day & found the latitude to be $34^{\circ} 27' 27''$ being 4'' less than yesterday; should no more observations for the Latitude be made here, we may consider it as fixed at $34^{\circ} 27' 29''$. The Therm: at 3^h p.m. 47° . We may prepare for another cold night: a flock of swans passed us to day: we have had an abundance of venison & turkey since we landed here, sufficient to supply the whole party with fresh provisions. The bank or hill upon which we are encamped is at least 50 feet perpendicular above the present level of the river, and therefore I presume 30 feet clear of inundation. Some hills of considerable height are in view, clothed with pine trees, but the lands around us extending far beyond our view, lie very handsomely for cultivation; the superstratum

stratum is of blackish brown color from 8 to 12 inches deep, lying upon a yellowish basis, the whole intermixed more or less with stone & gravel & fragments of blue schistus, which is frequently found so far decomposed as to have a strong aluminous taste. The therm: at 8^h p.m. 26°; very serene and calm, the stars shone with uncommon lustre: in an hour more the face of the heavens was changed, a general cloud produced an intense darkness; the therm: rose to 36° and we expected snow or rain; after midnight notwithstanding, the clouds were dissipated, the face of heaven recovered its brightness & the Stars shone with undiminished splendor. Extremes of the therm: 10°—47°

{ 1804
December

Therm: in air 19° in river water 41° very Sunday 9th serene — Wind moderate at N.W. river risen 2 inches. The people returned from the springs between 9^h & 10^h a.m. and after some time given for repose and refreshment, the party set out again with such baggage as was immediately wanted, and Doctor Hunter and myself accompanied them; the people complained of the length of the road and weight of the loads, we therefore diminished the latter; The Sergeant and one private remained in care of the Barge and her stores. We left the river camp about noon and with many delays and halts for resting we arrived at the hot springs at 4½^h p.m.—
the

1804 } the distance is computed to be 9 miles, which
 December } we shall verify by actual measurement, probably
 on our return : the first six miles were in a general westerly direction with many sinuosities and the last three northerly, which courses were necessary to avoid crossing some very steep hills. We found on the way three principal salt-licks & some inferior, which are all frequented by buffalo, deer &c the soil around consisted of a white tenacious clay, probably fit for Potter's ware; hence the name 'Glaise' which the french hunters have bestowed upon most of the licks which are frequented by the beasts of the forest, altho' salt is not always to be found in such places so as to merit attention: we saw on the way recent tracks of the Buffalo and several Deer skipped along before us; we did not follow the game, being desirous of arriving at our destination before evening. The people were much fatigued with this days labor, altho' the road is by no means bad or hilly, but there is no doubt that a heavy load constantly bearing a man down must be very fatiguing upon the best of roads : the time and difficulties of moving our small baggage and provisions, altho' nothing but what is essentially necessary, to so small a distance, naturally suggests the inconveniencies which must arise in transporting over unknown mountains between the sources of the red and Arcansa rivers, baggage & provisions indispensibly necessary,

cessary, with tools and implements for the construction of a boat or boats to descend the 2^d { 1804
December
river. Soldiers accustomed to carry moderate loads only, would find it intollerable to transport burthens which would be thought light by a Canadian or other woodsman enured to such hardships: a little calculation will shew what ideas we ought to form upon this subject. The provisions, instruments, arms & other baggage which may be deemed indispensable for 15 persons engaged on such an expedition, i. e. what must be transported from the head of one river to the commencement of navigation on the other, are certainly not over-rated at 3000 lib; of the whole party 10 carriers are the highest number we can calculate upon, some being necessary to guard the two camps while the scientific persons unattended would explore the environs: those 10 carriers from what we have seen could not be expected to carry for a number of days successively more than 50 pounds each (several of our people were incapable of doing so much) and ten miles to go loaded & return empty day after day even on a tollerably level road, is perhaps beyond what we can flatter ourselves with accomplishing; thus it would require at least six days to transport the baggage 10 miles, and the seventh would be demanded as a day of repose: now if the heads of navigation should be only 50 miles apart, & the passage not
rugged

1804 }
December }

rugged or mountainous, it would require at the least 35 days to pass along the unknown region ; and if allowance be made for such difficulties as ought to be expected including bad weather, we shall perhaps still flatter ourselves, if we expect to complete this portage in 50 days : on due consideration therefore it may be more advantageous (if the expedition is to be carried on by soldiers who cannot travel without their rations, tents, baggage & above all their execrable whisky) to explore one river only at a time. When arrived at the head of Navigation which will constitute a kind of head quarters and point of departure, the scientific men with a sufficient party may make with tollerable convenience excursions of 30, 40 or 50 miles in all directions, prolonging the time according to the fortune of procuring game, which will enable the party to reserve the provisions taken from Camp for their return : an advantage resulting from this plan would be the facility of transporting specimens of natural history meriting attention ; it is evident that this benefit must, upon the other plan, be nearly given up excepting on the descent of the second river. I am not ignorant that the plan originally proposed may be carried into effect, but this must be done by persons chosen for the object, in order that it may be done with economy & in a reasonable time: Two young men of science of robust constitutions attended by four Canadian
or

or other woodsmen inured to fatigue and who
 can depend altogether on their guns for subsist-
 ence may accomplish this object; they will be
 able to transport at once, their blankets, their
 arms and amunition, a little parched meal, very
 light instruments, such as a 3 inch sextant which
 may be graduated to 20" of a degree, a pocket
 case with a few re-agents for mineralogical as-
 says, and 3 or 4 days provisions in case of disap-
 pointment in finding game; (spirituous liquors
 must be out of the question :) Such a party, each
 carrying a light ax for the purpose of building
 Canoes &c may accomplish the object proposed,
 upon supposition that no hostility is to be ap-
 prehended from the natives.

{ 1804
 December

From the river camp for about two miles,
 the lands are level and of second rate quality,
 the timber chiefly oak intermixed with others
 common to the climate and a few scattering
 pine-trees; further on, the lands on either hand
 arose into gently swelling hills, clothed chiefly
 with handsome pine-woods: the road passed
 along a valley frequently wet, by numerous rills
 and springs of excellent water which broke from
 the foot of the hills: as we approached the hot-
 springs the hills became more elevated and of
 steep ascent & generally rocky; those hills are
 here dignified by the name of mountains, altho'
 none of those yet in view exceed 4 or 500 feet;
 it is said that mountains of more than five times
 the

1804 } the elevation of these hills are to be seen in the
December } North-west towards the sources of the Washita
river ; one of those has been called the glass,
Chrystal or Shining mountain, on its surface is
to be found vast numbers of large hexagonal
prisms of very transparent colorless chrystal, gen-
erally surmounted by pyramids at one end, rarely
at both ; they do not produce a double refraction : many searches have been made over those
mountains for the precious mettals, but hitherto
without success, so far as I can learn.

We found at the Hot-springs an Open Log-
Cabin and a few huts of split boards, all calcu-
lated for summer encampment, & which have
been erected by persons resorting to the Springs
for the recovery of their health ; we shall en-
deavour to render our temporary lodging com-
fortable for the people and ourselves during the
short time we expect to stay here : we are a
little discouraged by the dilatory ways of the
Soldiers ; it is evident that to promote the ad-
vancement of an object similar to ours, they
ought to be commanded by a commissioned
officer, whose manners and disposition would
render him an agreeable companion to his fel-
low laborers : it cannot be said that the Soldiers
are disobedient, on the contrary they are to me
uniformly respectful, but it sometimes appears
that a spur is wanting, & there is no person here
who treats them otherwise than with civility ;
there

there is also some appearance of design to prolong their return to new-orleans, the present service being much more agreeable to them than the duty of a garrison under the eye of their officer. { 1804
December

On our arrival we immediately tasted of the hot-spring water, that is, after a few minutes cooling, for it was impossible to approach it with the lips when first taken up, without scalding: having arrived here without prejudice for or against the springs I did not discover any other taste except that of very good water rendered hot by culinary fire; some of our people pretended to have discovered cathartic properties, which must be feeble, as I have been unable to detect the existence of such a quality in the waters. Therm^r at 8^h p.m. 28°. Extremes 19°—42°

Therm^r 26°—very serene. Wind moderate at Monday 10th N.W.—We spent a cold night in our new lodgings, not being able to keep up a large fire in the Cabin, which is only 12 feet square without a chimney. From the complaints of great fatigue by the people, we found it necessary to allow some repose, and ordered the people to go into the river camp, there to remain during the night and return the day following with more of our baggage, directing the loads to be made still lighter: the day proved serene and fine, but as we had been obliged to leave our instruments

1804 } struments yesterday at the river-camp, no astro-
 December } nomical observations could be made this day.
 We visited all the hot springs ; they issue from the sides and foot of a hill placed on the east side of the narrow valley where we are hutted, one small spring only rises out of the face of the west bank of the creek ; from the quantity of calcareous matter deposited by it it does not appear to be of long standing ; a natural conduit probably passes under the bed of the creek to supply it. There are four principal springs arising immediately on the east bank of the Creek, one of which may rather be said to spring out of the gravel bed of run ; a fifth smaller one is that just mentioned rising on the west side of the creek ; a sixth of the same magnitude is the highest or most northerly one rising near the bank of the Creek ; those are all the sources which merit the name of springs near to our huts ; but there is a considerable one some distance below, & all along the creek at intervals the water oozes out or drips from under the bank into the creek, which during the present cool season is very evident from the condensed vapor which floats along the margin of the Creek, where those drippings are visible & even where none is to be seen ; a statement will hereafter be given of the temperatures of the respective springs with the quantity of water delivered and references to their respective positions ;
 from

from some slight trials, it appears that the highest temperature is about 148° to 150° of Fahrenheit's thermometer. { 1804
December

In the afternoon we ascended the hill of the hot springs, it is of a conical form terminating at top with a few loose fragments of rocks covering a flat space of twenty five feet diameter: altho' we have said the hill is conical, yet it is not entirely insulated, for it is connected by a very narrow ridge with the neighbouring hills.

The primitive rock of this hill above the base is chiefly Silicious, some part of it being of the hardest flint, others of the nature of freestone extremely compact & solid, and of a great variety of colors; the base of the hill, & indeed for a considerable extent, is composed of blackish blue schistus, which divides into perpendicular laminæ like blue slate; The water of the hot springs is therefore delivered from the siliceous rock, but this is generally invisible at the surface, being encrusted by or rather buried in the mass of calcareous matter, perpetually precipitated from the water; iron in small proportion was also deposited in form of a red calx, the colour of which was frequently distinguishable in the lime.

Under the hottest water we observed a lively green appearance, which at first induced us to suppose that copper might be present, but on closer inspection, we found it to be a soft tender matter,

1804 } matter, perhaps a feculum deposited by the water;
 December } it may possibly be of the same nature with the
 green matter found in conduits or even in well
 buckets under pure water at common tempera-
 ture, respecting which a dispute arose (I think)
 between Doctor Priestly and other Philosophers,
 whether this green mater is a perfect vegetable
 or only a feculum; the question is perhaps now
 decided (if we suppose the green matter of the
 hot springs to be of the same kind) for by rea-
 soning from analogy, no vegetable can be sup-
 posed to exist in the temperature of 150° ; but
 we must beware of presuming to set bounds to
 the powers of Nature: we shall hereafter ex-
 amine this matter with due attention; we shall
 only now observe, that this substance seems to
 be deposited by successive thin laminæ.

As we advanced up the calcareous region of
 the hill, we discovered several patches of rich
 black earth, which appears to be formed by the
 decomposition of the calcareous matter: in other
 situations appeared an incrustation of limestone,
 i. e. the superficial earth was penetrated, indu-
 rated and encrusted by lime with fine laminæ or
 minute fragments of iron ore: we entertained
 no doubt that the water of the hot springs had
 here issued formerly from the hill and run over
 the surface, and that the entire mass of the cal-
 careous rock to the height of one hundred feet
 perpendicular has been created by the incessant
 depositions

depositions of the hot springs; in this high situation we found a spring whose temperature is { 1804
December
140°

After passing the calcareous region, we found the primitive hill covered by a forest, whose trees were not of the largest size; they consisted chiefly of Oak, Pine, Cedar, Holly, hawthorn with many others common to the climate, with a great variety of vines, some said to produce black & some yellow grapes, both excellent in their kinds: the soil is extremely rocky, interspersed with gravel, sand & fine black vegetable mold. When we had advanced about 250 feet perpendicular up the hill, we found a change in the soil; it was equally stoney & gravelly as below with a superficial coat of black mold but immediately under the last was found a basis of fat, tenacious, soapy, red clay, inclining to the colour of bright spanish snuff; it seemed to be very homogeneous with scarcely any admixture of sand and no saline taste, but rather soft and agreeable; the same timber continues but diminishing in size as we ascend the hill, and rocks increasing to the top: We estimate the whole height of the hill to be about 300 feet above the level of the valley where we are hutted. Therm: at 8^h p.m. 28° Extremes 26°-50°

Thermometer before sun-rise 48° Wind S.E. Tuesday 11th
The weather changed very much in the night;
it

1804 } it became much warmer and the heavens were
December } overcast with one general cloud; the air was
still damp and penetrating, and our mansion pervious to the chilling blast, but we made good fires and comforted ourselves in the expectation of favorable weather to enable us to complete our observations and researches. The People arrived about one o'clock in the afternoon with a few things including the instruments.

At 3^h p.m. the thermometer rose to 59° and in the evening at 8^h fell to 50°, the weather being still disagreeable and cloudy. Some venison was brought in after dinner — The People five in number went back to the river to fetch tools and necessities, while others were occupied in raising a log-chimney at the end of our Cabin, which we proposed to line with stone as a security against fire. No change in the appearance of the weather at bed-time. Extremes of the therm: 48°–59°

Wednesday 12th Thermometer before sun-rise 36° The weather has become colder, but still continues overcast, damp and disagreeable, the wind being about north, a few drops of rain fell last evening & during the night. As it still continues cloudy, no astronomical observations could be made, I therefore occupied myself in the forenoon in bringing up and completing my journals, and in the afternoon went to examine all the hot springs with
the

the thermometer : four principal springs seemed only to merit attention ; those which yielded the greatest quantity of water were of the highest temperature and are in the following order. N^o 1 — 150° N^o 2 145°—N^o 3—136 and N^o 4 132° the last in order is the only one on the west side of the creek and I did not perceive any signs of hot water anywhere else on that side of the Creek, I therefore conceived that the spring N^o 4 is supplied by a channel under the Creek from the general reservoir in the hill on the East : at the spring N^o 3 was a small bason of some little depth, in which was a considerable quantity of the green matter in temperature 134° it had much the appearance of a vegetating body, being detached from the bottom yet connected by something like a stem which rested in Calcareous matter, the body of one of those pseudo-plants was about 4 to 5 inches diameter, the bottom a smooth film of some tenacity & the upper surface divided into ascending fibres of $\frac{1}{2}$ to $\frac{3}{4}$ of an inch long resembling the gills of a fish, formed into a kind of transverse rows ; not being then prepared for a more minute investigation, a future examination will be made with the microscope. Should it prove that this is a vegetable production and not an accumulation caused by precipitation, it will be a new proof of the wonderfull powers of nature in the production of animal & vegetable life in temperatures

{ 1804
December

1804 } peratures which have been hitherto thought suf-
 December } ficient to extinguish the vital principle : Should
 this green matter prove to be vegetable, I shall
 confidently expect the discovery of animal life ;
 for no plant I believe upon due research will be
 found without its animal inhabitant. A little
 farther on, we came to another small muddy
 bason, in which a vermes about $\frac{1}{2}$ an inch long,
 was moving with a serpentine or vermicular mo-
 tion, the water was found a little warm to the
 finger : I observed invariably that the green mat-
 ter forming on stones & leaves covered a stratum
 of Calcareous Earth, sometimes a little hard &
 brittle, but at other times soft and imperfect, but
 whether the lime favors the production of the
 green matter or vice versa, we probably shall
 not have time to ascertain. Therm^r at 8 p.m.
 36° Extremes 36°-50°

Thursday 13th Therm^r before sunrise 26° Wind north. The
 weather still continues cloudy, dark and disagree-
 able ; finding no probability of making any as-
 tronomical observations this day I determined to
 make an excursion upon the neighbouring west-
 ern mountain, and having gained one of its sum-
 mits about $\frac{1}{2}$ a mile from the Camp, took various
 courses of Hills & points on the river, & hav-
 ing gone to its extreme summit to the westward
 about a mile distant, I took courses to the same
 points in order to ascertain nearly their positions:

We

We had several fine prospects from this hill, which we estimated to be 300 feet higher than the valley of the hot Springs where we first ascended, and 400 feet at its western extremity; the valley of the Washita river comprehended between the hills on either side, seemed a perfect flat & about 12 miles wide, on all hands we saw the hills, called here mountains rising behind each other: in the direction of north the most distant were supposed to be 50 miles off, & are considered to be those of the arcansa river, the rugged mountains which divide the waters of the arcansa from those of the Washita prevent the Osage Indians from visiting the Washita river, of whose existence they are in general ignorant; were it otherwise, their excursions here, would prevent this place being visited by White persons or even Indians of other tribes, as they make no difficulty of traveling round the mountains which give birth to the Washita by the great prairies, which lie east of the great dividing Ridge, and it is known that those robbers plunder indiscriminately all they can find. In the direction of S.W. we saw at about 50 miles distance, a ridge perfectly level which we supposed to be the high prairies or planes of the red river, so that we had under our Eye an horizon whose diameter was 100 miles, incomplete to the East & N.W. Notwithstanding the late severity of the weather, we found along the ridge a considerable

1804 } siderable number and some variety of plants in
 December } flower, & others retaining their verdure, We
 found indeed the ridge much more temperate
 than the valley ; When we left the valley it was
 extremely damp, cold and penetrating ; upon as-
 cending the ridge, the atmosphere became dry
 & mild, so that walking thereon was perfectly
 agreeable : a few of the plants in flower were
 collected for specimens, but what surprised us
 much was to find upon this ridge a species of
 Cabbage, the plants grew with expanded leaves
 spreading on the ground, of a deep green with
 a shade of purple, the taste of the cabbage was
 plainly predominant with an agreeable warmth
 inclining to the raddish ; several tap-roots pene-
 trated into the soil, of a white colour, having
 the taste of horse raddish, but much milder ; a
 quantity of them were brought to camp & when
 dressed proved palatable & mild ; it is highly
 improbable that any Cabbage seed has ever been
 scattered upon this ridge, the hunters ascending
 this River have always pursued far different ob-
 jects ; we must therefore consider this Cabbage
 (untill farther elucidation) as indigenous to this
 sequestered quarter & may be denominated the
 Cabbage raddish of the Washita. I shall preserve
 and take with me several living plants in hopes
 of procuring in due time seeds from which the
 curious may be furnished. We also found grow-
 ing here a plant which is now green, called by
 the

the French 'racine rouge' (red root) which is said to be a specific in female obstructions, it has also been used combined with the china root to die red, which last probably acts as a mordant : having understood that it has also been used with the bark or root of an aromatic Vine, (which I shewed to M^r Bartram at Baton Rouge) for the same purpose of fixing a red die. The top of this ridge is in a manner crowned by rocks of a flinty kind. So very hard as to be improper for gun flints ; when applied to that purpose, it very soon digs out cavities in the hammer of the lock. This hard stone is generally white but frequently clouded with red, brown black & some other colours, and no doubt in the hands of a practical mineralogist, would receive a variety of denominations such as agate, jasper, calcedony, Carnelian & perhaps some of the adamantine genus. Notwithstanding the abundance of rock, a great deal of excellent black vegetable earth was found along the ridge, and generally an understratum of darkish or greyish brown earth producing oak & Hickory with other woods & a great number of grape vines, said to yield excellent black grapes, there is no doubt that this soil upon the top & sides of these hills is well adapted to reward the labors of an expert Vigneron. Here & there we met with fragments of Iron stone & often where a tree had been overturned by the roots, some schistose stones were brought to view which

{ 1804
December

1804 } which were suffering decomposition by their
 December } exposure to the atmosphere; in returning we
 descended the hill obliquely & found for 200
 feet perpendicular the same kind of stone, much
 broken into loose fragments, and slipping under
 foot frequently endangered our falling, the hill
 being in many places extremely precipitous: in
 this position we dug into the side of the hill
 and found the 2^d stratum to consist of a reddish
 Clay somewhat resembling that found near the
 top of the Conical hill to the East of our Camp,
 but not so highly coloured nor so argilacious,
 the proportion of silex being manifestly much
 greater. We continued to descend and found at
 $\frac{2}{3}$ of the hill downwards, the rock to alter con-
 siderably. & altho' it still continued siliceous, yet
 it was rather a very hard freestone mixed with
 fragments of flint which had probably rolled
 from above, descending still lower we found a
 blue schistus, in a state tending to decomposition
 wherever it was exposed to the atmosphere;
 more interiorly the schistus was hard resembling
 coarse Slate. Few other argilacious stones pre-
 sented themselves to view, the siliceous were al-
 ways predominant; & we often found what had
 much the appearance of the Turkey oyl-stone.
 Towards the base of the hill was a considerable
 expansion of tollerably good land, lying suffi-
 ciently level for cultivation and is supposed to be
 a good soil for wheat. The timber such as above
 described

described with a large proportion of Pine. { 1804
Therm^r at 8^h p.m. 30° Extremes 26°–40° wind { December
North.

Therm^r 28° Wind N.E. Cloudy, dark, cold Friday 14th
and sleet—This morning has made no improvement upon the weather; rain & sleet fell in the night & the ground is hard frozen. D^r Hunter had proposed an excursion into the mountains with a Party this day, but the appearance of the weather forbids it: the bad state of our mansion calling for further repairs in the present severe weather, we employed some of our people in shutting up the cracks and openings between the logs, which will render our dwelling more comfortable; placed some of the flowers collected between hortus-siccus-paper and had the roots of the new Cabbage planted so as to be preserved until our return.

The day continues to drip a little from time to time, being still dark, damp and disagreeably cold. Therm^r at 8^h p.m. 32° Extremes 28°–40° We have news from the Sergeant that the river has fallen 5 feet.

Therm^r 26° Wind N.W. strong. The morn- Saturday 15th
ing was cloudy, but less dark and disagreeable than the day before. The air became drier and the clouds were dissipating by 9 & 10 o'clock; prepared for a meridian observation; the wind
blew

1804 }
December } blew very strong down the valley, we are here placed as in a point of convergence ; for whether the wind blows directly or obliquely into the valley from above or below, it is reflected from the faces of the hills on one hand & by three lesser vallies on the other so as to have its force directed against this point as a Center ; there will therefore be a breeze here when there is none upon the adjoining hills, perhaps the rarefaction produced by the hot Springs may also contribute in some measure at this season. At noon had an observation altho' much disturbed by the frequent recurrence of violent blasts of wind which greatly agitated the mercury of the artificial horizon ; it appears that the Lat. here will be about $34^{\circ} 31'$, but as I intend to make a short series of observations with the face of the Instrument both East & west, the final result will then appear. Therm^r at 3^h p.m. 32° at 8^h p.m. 30°

Sunday 16th Therm^r 21° Wind moderate N W this morning is cold but promises fine weather, the wind nevertheless arose at 9 o'clock & continued to blow strong all day. Prepared for astronomical observations. Took corresponding equal altitudes of the Sun with corresponding azimuths before & afternoon, with the help of a common circumferenter, by which it appears that the magnetic variation is $8^{\circ} 20'$ East ; this being
about

about the expected variation, we may conclude, { 1804
December
 that the needle is not here influenced by any local attraction Took also equal altitudes for the regulation of the watch before & afternoon. Took also the Suns mer. alt. with the face of the Instrument reversed, and in the Evening between 10 & 11 o'clock, the Therm^r being at 22° perfectly serene & calm, took 9 lunar distances between the moon's east limb & α Arietis; the evening was perfectly agreeable & not sensibly cold altho' the Therm^r was so low; I conclude these observations to have been made with great accuracy from the advantages of the circumstances, the Circle was mounted on its pedestral very firmly, the Star towards the west & the moon over head so that when both were brought into the field of view & the Star made to move gently across the limb of the moon by a turn of the foot screw backwards & forwards, or by sliding the foot a little to the right & left so as to discover the true point of contact on the moon's limb, the Star being left a little open, the observer had only to wait with his eye fixed on a permanent steady object untill he was convinced of the contact being perfect; I consider one observation made in this way superior to any number or set of observations made by an instrument supported upon the arms of the most experienced observer; I would therefore recommend to all persons using a Sextant or reflecting
 .
 Circle

1804 } Circle by land, to adopt a pedestal of support
December } with the three necessary motions ; the superiority is so great that he who has accustomed himself to use the one mode cannot reconcile himself to the manifest imperfection of the other ; the observation being made the angle is read off without stirring the Instrument, so that every thing is ready fixed to the eye for the next observation ; I perceive that when all things are favorable a set of distances may be taken by the difference of 1' of a degree precisely between the observations ; i. e. by moving the index before making the observation, exactly one minute in advance, so that it may be written down by the assistant before the time of counting Seconds : this will operate as a check also upon the negligences of young assistants, a mistake in minutes of time would thus be easily detected ; this mode I shall follow in future, as being easier and more perfect : Therm^r at 8^h p.m. 22° Extremes 21°—34°

Monday 17th Therm^r before Sun rise 26° wind moderate N.W. The morning is bright & promises a fine day. Yesterday Doc^r Hunter made an excursion into the mountains, & to day he goes again. He discovered nothing of importance hitherto, the only metal of which we have seen any indications has been Iron, the ore of which is scattered about in small fragments upon the hills and in the
the

the water courses. Prepared for observation — { 1804
took equal altitudes of the Sun before & after- { December
noon to correct the watch, which compared with
the result of yesterday's equal altitudes will give
the rate of the watch's going, by which the true
time of the Lunar observations will be precisely
ascertained: took the Sun's meridian altitude
with the face of the Instrument again reversed:
prepared to observe the distance of the moon
from Aldebaran, expecting fine observations from
so bright a Star, but we were disappointed, the
evening become hazy, the Stars frequently ob-
scured, and a large halo with a broad white brim
appeared around the moon. The night became
cloudy & some drops of rain or sleet fell. appear-
ance of bad weather for to morrow Therm^r at
8^h p.m. 28°. Extremes 26°—42°

Therm^r 34° wind north, Cold, damp, dis- Tuesday 18th
agreeable. The appearance of the weather pre-
vents D^r Hunter from making another excursion
to day, some rain fell in the night, but the aspect
of this morning bespeaks snow or sleet. Hav-
ing no better occupation in the present state of
the weather, I brought up my journals and began
to form a list of all the vegetables I had seen
here and in the neighbourhood upon the River
which will be inserted in this journal when made
a little more complete; The day continues dark,
cloudy & rainy: in the afternoon it began to
hail

1804 } hail & in the evening it snowed pretty fast;
December } about 8^h p.m. it was 3 inches thick; Therm:
at the same hour 32° Extremes 32°-36°

This evening Doc^r Hunter was very much indisposed but was relieved before bed time.

Wednesday 19th Therm^r 30° wind in the valley West, but changeable; This morning we have a full prospect of a northern winter, the ground is covered 4 inches deep with snow and it continues from time to time to fall, tho' not remarkably fast, the eves of our Cabin hang with beautiful icicles, which we have the pleasure of admiring thro' the logs as we sit by the fire side: out-door business being out of the question, I continue to augment my list of vegetables from memory & with the help of the pilot, who proves to be tolerably intelligent. The Doctor has been unable to discover any thing in the water of the hot springs except some weak acid which is probably carbonic; the water has been from this cause a little hard & therefore not so proper for washing, as the soap is decomposed in some measure: the same state of the weather continues, the therm^r at 3^h p.m. being at 30° and at 8^h p.m. 28° at bed time the weather still continues dark and threatening more snow.

Thursday 20th Therm^r 30° wind in the valley west. There appears over head driving light clouds from the N. W.

N.W. The snow still continues lying on the ground, the night was very cold, but has greatly softened towards morning, from appearances we expect a thaw, it becomes a little clearer. The D^r and myself both a little indisposed probably from cold & wet feet and the inclemency of the weather; after breakfast, some hopes of the clouds dissipating. The Sun has shewn himself thro' the veil of clouds for a moment, Prepare for observation but disappointed the heavens are again completely veiled in clouds and a thaw comes on, the Therm^r being at 36° at 3^h p.m. Engaged writing great part of the day. Examined some water of one of the hot springs, which stood a little stagnated on one side, its temperature 132° found no living animal in it, by the aid of an excellent microscope examined also some of the green matter and the white coagulum lying under it which I shall further prosecute with day light, being unable yet to determine whether the green matter is vegetable or merely a feculum. Therm^r at 10^h p.m. 32° The weather continues cloudy & the snow lies upon the ground the thaw having stopped.

Therm^r, 32° Wind N. No favorable change Friday 21st as yet in the weather; cloudy, damp, dark & cold, the snow still lies upon the ground, so that the D^r is unable to undertake another more considerable excursion as he intended. We were
in

1804 } in hopes also of making another set of astro-
 December } nomical observations for the Long. of this place,
 but as the time is now much advanced we shall
 be desirous of getting away as soon as the weather
 permits the transport of our baggage: — in the
 meantime the Doctor is desirous of making
 another excursion while we are preparing to
 move: observed a spot of ground on the same
 side of the creek with the hot Springs, covered
 with herbage which had not lost but partially its
 verdure; upon this spot no snow lay, it appeared
 to thaw as soon as it fell, altho' on other places
 even very near some of the hot springs the snow
 remained undissolved; as soon as the weather
 permits I shall examine this ground and ascer-
 tain the temperature which resists the rigours
 of winter: what a fine situation for a green or
 hot house, where at a small expence all the
 tropical fruits may be propagated. Therm^r at 3^h
 p.m. 36° it has rained a little we were in hopes
 of seeing the snow carried away, that it might
 afterwards become dry under foot: yesterday
 our pilot & some of the people went out a hunt-
 ing & fell in with some buffalo; two of them
 were shot at and grievously wounded, the blood
 streaming from their sides as this happened in
 the evening they were unable to follow the
 chase, but returned to the pursuit this morning,
 they discovered the tracks and blood which they
 followed great part of the day without com-
 ing

ing up with the buffalo & were obliged to return without success; it appears that the great strength of this animal enables him to carry off on many occasions several shots without falling, it is necessary to shoot him thro' the heart to make him fall speedily; we are told that a rifle bullet is by no means certain (if ever so well directed) of penetrating thro' the skull into the brain, or if it does, provided the ball only reaches into the front or fore part of the brain, the animal will not fall; some even assert that the thickness and strength of the skull with the immense quantity of hair which covers the head of the buffalo will resist the penetration of an ordinary rifle bullet. Some venison was brought in so that we are never without fresh provisions. The Turkeys are not plenty in this neighbourhood, keeping near the river. Found a myrtle wax tree covered with its fruit, which must have hung since july or August, the wax is no longer green having changed its colour to a greyish white by being so long exposed to the atmosphere; examined the berries with the microscope; the whole berry is a little oval and less than the smallest garden pea, the nucleus or real seed is as large as a raddish seed covered all over with a number of brownish kidney shaped glands of a brown colour & sweetish taste, those glands secrete the wax, which completely envelops them & gives the whole the appearance
at

{ 1804
December

1804 } at this season of an imperfectly white berry;
 December } this is a valuable plant and merits cultivation;
 its favorite position is a dry soil rather poor &
 looking down upon the water, it is excellently
 adapted to ornament the Margins of Canals,
 lakes or rivulets; the Capina Yapon is equally
 beautiful & proper for the same purpose. It
 grows here along the banks of this stoney Creek
 intermingled with the myrtle, and bears a beau-
 tiful little red berry very much resembling the
 red Currant. Therm^r at 8^h p.m. 31°

Saturday 22nd Therm^r 31° wind N. dark & cloudy, the Snow
 continues upon the ground. without any pros-
 pect of favourable change; after breakfast it be-
 gan to rain, the water the rain froze as it fell
 upon the branches of the trees, many limbs broke
 down around us in consequence of the weight of
 the Ice adhering to them; we are still confined
 within doors by the inclemency of the weather
 which greatly retards us, so that we cannot even
 prosecute our intended researches respecting the
 hot springs. Engaged writing great part of the
 day; we had 10 quarts of the hot spring water
 evaporated which produced about 10 grains of
 matter, of which the chief part appeared to be
 carbonated lime with some feculum, the greater
 part dissolved with effervescence in the muriatic
 acid. The Therm^r at 3^h p. m. 36° The day
 continues unfavorable & keeps dropping rain
 from

from time to time, yet the snow does not melt : { 1804
The temperature of the hot springs remains the { December
same as in the former trial & the temperature of
boiling water was ascertained to be 212° ; hence
it appears that this place is not elevated so as
sensibly to alter the pressure of the atmosphere,
otherwise water would boil at a smaller temper-
ature. Caused a number of the grape vines to be
dug up ready to carry along with us. The Doctor
goes on with some more experiments upon the
Spring water, the results will be hereafter given.
Therm^m. at 8^h p.m. 34° Snow falls again this
Evening — no prospect of a change.

Therm^m. before sunrise 30° . Wind N.W. by Sunday 23rd
the clouds. blows down the valley reflected from
the side of the hill N.N.E ; this morning some
appearance of a change. The clouds (scudding
from the N.W.) begin to dissipate, the blue
celestial Sky appears in several parts of the hea-
vens. The snow still lies partially on the ground
— but we hope it will soon dissolve as the Sun
appears ; prepare for taking equal altitudes in
which I succeeded so far as to take the triple
contact in the morning for the regulation of the
watch and also one azimuth with time & alti-
tude for finding the variation of the magnetic
needle ; prepared for a meridian observation in
order to complete my set of 4 observations for
the Latitude of this place, but was disappointed
by

1804 } by the intervention of Clouds ; seeing no pros-
 December } pect of taking correspondent altitudes in the
 afternoon determined on visiting the hot springs
 & adjacent places : It requires a length of time
 to form a good judgement of a new object, such
 as the curious one now before us, on the first
 view we see a creek with a margin of rock &
 the hot springs here and there trickling over or
 passing thro' them ; the Creek seems to be un-
 dermining the rock, which frequently cracks,
 divides and falls into the Creek ; upon a closer
 examination it will be found that the water of
 the Creek does not undermine the rock, but on
 the contrary the rock is continually encroaching
 upon the breadth of the creek ; the hot water
 is perpetually depositing calcareous matter, per-
 haps some siliceous matter also : the new formed
 rock by those means is continually augmenting
 & projecting its cliffs and promontories over the
 running water, which prevents this formation
 below its own surface : wherever the calcareous
 crust is seen spreading over the bank & margin
 of the Creek, there most certainly the hot water
 will be found, either passing over the surface or
 thro' some channel perhaps below the new rock,
 or dripping from the projecting edges of the
 over-hanging precipice ; the progress of nature
 in the formation of this new rock is curious &
 worthy the attention of the mineralogist ; when
 the hot water issues from the fountain it fre-
 quently

quently spreads over a superficies of some extent ; { 1804
so far as it reaches on either hand there is a de- { December
position of dark green matter which may either
be a plant or only a feculum, I have not yet
been able to pronounce which, several laminæ
of this green matter will be found lying over each
other; immediately under and in contact with
the inferior lamina which is not thicker than
paper is found a whitish matter resembling a
coagulum ; when viewed with the microscope,
this last is also found to consist of several, some-
times a great number of laminæ, of which that
next the green matter is the thinnest and finest
being the last formed, those below encreasing in
thickness & tenacity, until the last terminates on
a soft earthy matter, and this last reposing on
the more solid rock ; each lamina of the coagu-
lum is penetrated in all its parts by calcareous
grains which are extremely minute and divided
in the more recent web but much larger and
occupying the whole of the inferior lamina ; I
think it probable that the coagulum is silex and
no doubt the grains are lime the under stratum
is continually consolidating & adding bulk and
height to the rock ; when this acquires a certain
elevation the water always seeking the quickest
descent will find its way over another part of the
rock, hill or margin of the creek & forms accu-
mulations by turns over the whole of the adjacent
space ; the green matter is also designed by nature
for

1804 } for a useful purpose ; when the water by seeking
 December } new channels has entirely forsaken its former
 situation, the green matter which acquires some-
 times a thickness of half an inch, is speedily
 converted into a rich vegetable earth & becomes
 the food of plants, the calcareous surface itself
 decomposes and forms the richest black mold
 intimately mixed with a considerable proportion
 of silex (formed as I have supposed from the
 coagulum) plants and trees of every kind now
 vegetate luxuriantly upon this soil ; many how-
 ever thrive upon the rock, where very little earth
 is to be seen, particularly the cedar which seems
 to grow from between the clefts of the hard rock.
 The grape vine also seems to prosper in this un-
 promising situation. I proceeded to examine the
 piece of ground (above-mentioned) upon which
 the snow would not lie: I found it covered in a
 great measure with herbage, which was in part
 turned brownish by the season, altho' there was
 on a part of it a very small fine grass which was
 green, a calcareous Crust appeared in some places
 at the surface but in general there was a depth
 of 5 or 6 inches & in some places a foot of the
 richest black mold, the surface was manifestly
 warm to the touch; the Therm^r in the air was
 then at 44° when placed 4 inches under the
 surface & covered with earth, it rose rapidly to
 68° and when placed at 8 inches or upon the
 calcareous rock and covered up it rose to 80°
 this

this result was very uniform over the whole surface which was about a quarter of an acre : { 1804
December
in searching we found a spring about 15 inches under the surface which raised the Therm^e to 130°. Under the black mold was found a brown mixture of lime and silex very loose and divisible, which appeared to be advancing in its progress of decomposition towards the formation of black mold, under the brownish mass it gradually became whiter and harder and at the depth of six to 12 inches was nearly hard calcareous stone sparkling with silex : it was evident from every thing we saw around that the water had passed over this place & formed a flat superficies of siliceous limestone, and that its position nearly level had facilitated the accumulation of earth in proportion as the decomposition advanced : Similar spots of earth were found higher up. The hill resembling little Savannahs near which were always found hot springs, which had once flowed over the Savannahs ; it seems probable that the hot water of the springs, at an early period had all issued from its grand reservoir in the hill at a much higher elevation than at present, the Calcareous crust may be traced up in most situations on the west side of the hill looking down upon the Creek & valley to a certain height, perhaps 100 feet perpend: from that division the hill above rises precipitously & is studded all over with hard siliceous stones ;
below

1804 } below the descent is more gradual, the soil cal-
December } careous black earth, the rock itself very often at
the surface, & frequently there is a precipice
on the margin of the Creek or a very precipi-
tous descent along the calcarious new formed
rock. The Therm^r at 3^h p.m. was at 44° and at
8^h p.m. 38°. Doctor Hunter continues indis-
posed.

Monday 24th Therm^r before Sun rise 32°. Wind moderate
from N.W. Some prospect this morning of a
favorable change, the moon is visible, and the
Sun yet behind the hill, announces his approach
with a bright blaze: prepare for observation
— took the suns triple contact, hoping to ob-
tain correspondent observations in the afternoon
to regulate the watch. The moon was already
eclipsed by the Pine tree tops on the western
hill before the sun was risen high enough in
the East to enable us to take their distance; We
were therefore obliged to wait with patience
and ordered all the intervening trees to be cut
down to facilitate future observation: at noon
obtained a good altitude of the Sun but soon
afterwards it became cloudy, so that we got no
corresponding altitudes for the regulation of the
watch.

The Doctor found himself a little better, we
agreed to walk up the hot spring hill to make
new observations on this natural curiosity: we
now

now found it easy to trace out the separation between the primitive hill & that which has been accumulated upon its west side by precipitation from y^e waters of the hot Springs; this last is entirely confined to the west side of the hill washed at its base by the waters of the Creek, no hot spring being visible in any other part of its circumference; by actual measurement along the base of the hill, the influence of the Springs is found to extend 70 perches in a direction a little to the eastward of North; along the whole of this space the Springs have deposited stoney matter, which is probably principally Calcareous, but there is also evidence of Silex and Iron. All the Springs deposit red calx of Iron in their passage to the Creek; the existence of Silex does not appear to me to be so fully decided; there is certainly sparkling chrystals mingled with the lime, particularly remarkable in the calcarious matter partially decomposed, but having observed by the aid of the microscope that the whole of the calcarious rock exhibits nothing but a mass of congregated sparry matter, it is not improbable that those shining chrystals may be chrystalised lime; the Doctor is now employed upon an analysis which will, no doubt, decide the point; from some specimens I shall carry home with me, I shall hope to investigate the matter more at leisure. The accumulation of calcarious matter is much more considerable at the north

{ 1804
December

1804 } north end of the hill than towards the south;
 December } the first may be above one hundred feet perpendicular, but sloping much more gradually than the primitive hill above, until it approaches the creek, where not unfrequently it terminates in a precipice of from 6 to 20 feet: the difference between the appearance of the primitive and secondary hill is so striking, that the most superficial observer cannot avoid taking notice of it: the first is regularly very steep studded with rock and stone of the hardest flint and other siliceous compounds all extremely hard, a superficies of two or 3 inches of good mold covers a body of red clay above described: below on the secondary hill, which carries evident marks of recent formation, no flint or siliceous stone is to be seen; the Calcareous rock has concealed all from view, & is itself frequently covered by much fine rich black earth; it would seem that this compound which is precipitated by the hot waters, encloses in its own bosom the seeds of its destruction, for it is remarkable that when the waters have ceased to flow over any portion of the rock, a superficial decomposition will there speedily take place; tho' I am inclined to suspect that heat communicated from the interior of the hill below contributes much to this operation of nature, because it is observable, that insulated masses of the rock remain without change.

The

The Cedar, the Wax-Myrtle and the Cassina Yapon, all beautiful evergreens attach themselves particularly to the calcareous region, & seem to grow and thrive in the clefts of the solid rock : at small intervals along the line of separation between the primitive and secondary hill, we discover many sources of hot water ; some flowing with some degree of freedom, & others in a manner stagnated and shut in by the accumulations of Stoney Concretion extracted by their own operation from the bowels of the hill. Any spring enjoying a freedom of position proceeds with great regularity in depositing its solid contents ; the border or rim of its bason forms an elevated ridge, from whence proceeds a glacia all around ; when the waters have flowed for some time over one part of the brim, this becomes more elevated & the water can no longer escape on that side, but is compelled to seek a passage where the resistance is least, thus it proceeds with the greatest regularity forming in miniature a Crater resembling in shape the conical summit of a volcano ; the hill being steep above, the progress of petrification is stopped on that side, & the waters continue to flow and spread abroad, encrusting the whole face of the hill below. I am persuaded that the accumulations and extent of the calcareous matter would have been vastly greater, perhaps the whole valley might have been filled up with it, did not the

{ 1804
December

1804 } the continual running of the creek water put
 December } a stop to its progression on that side: the last
 formed calcareous border of the circular bason,
 (covered by the green feculum) is soft and easily
 divided, a little under it is more compact, and
 at the depth of six inches, it is generally hard
 white stone; if the bottom of the bason is stirred
 up, a quantity of red calx of iron arises and es-
 capes over the summit of the crater.

It is surprising to see plants, shrubs and trees
 with their roots absolutely in the hot water;
 this circumstance being observed by some of the
 visitants of the hot springs has induced some of
 them to try experiments by sticking branches of
 trees into the run of hot water; we found some
 branches of the wax-Myrtle thrust into the bot-
 tom of a spring-run, the water being at tem-
 perature 130° of Farheneit's thermometer, the
 foliage & fruit of the branch were not only sound
 and healthy, but at the very surface of the water
 fresh roots were actually sprouting from the
 branch; the whole being pulled up for exami-
 nation, it was found that the part which had
 penetrated into the hot mud was decayed: this
 phenomenon is so new & singular, that few per-
 sons will at first be disposed to believe, judging
 that deception or want of accuracy has led us
 into error; it is however in the power of every
 curious person who will give himself the neces-
 sary trouble to try the experiments himself; in
 the

the meantime Doctor Hunter and his son are { 1804
evidences of the truth of the above statement. December

— A luxuriant vegetation clothes the decomposed surface of the calcareous region, the black rich mold being of a good depth in some few places (6 or more inches) & in others shallower, and the rock in other situations is nearly unchanged, giving nourishment however to a mass of very short moss, which is gradually forming a soil different in appearance from that which is generated from the decomposed lime. The primitive part of the hill is greatly inferior in fertility to the secondary or recent portion, but it is far from being sterile: grape vines abound in both, particularly in the calcareous soil.

It may be proper to pause for a moment and enquire what may be the cause of the perpetual fire which keeps up without change the high temperature of so many springs flowing from this hill at considerable distances from each other. Upon looking around us, no data present themselves sufficient for the solution of the problem; nothing of a volcanic nature is to be seen in this country, neither have we been able to learn that in any part of the hills or mountains connected with this river, there is any evidence in favor of such a supposition. An immense bed of blackish blue schistus appears to form the basis of the hot-spring hill and of all those in its neighbourhood. The bottom or bed of the
creek

1804 } creek is composed of scarcely any thing else ; I
December } have frequently taken up pieces of this stone,
rendered soft by decomposition and possessing
a very strong aluminous taste ; it seemed to re-
quire nothing but lixiviation and chrystalisation
to complete the manufacture of alumn. As all
bodies which suffer chemical changes, generally
produce an alteration of temperature, it may be
enquired whether the decomposing schistus is
capable of generating a degree of Caloric corre-
sponding to the temperature of the hot springs.
Another cause we shall notice which perhaps
will be thought more satisfactory : it is well
known that in several positions within the Circle
of the waters of this river, vast beds of martial
pyrites exist ; they have not yet been discovered
in the vicinage of the hot springs, but it is ex-
tremely probable that they may be accumulated
in immense strata under the bases of those hills,
and as we have noticed at one place at least
some evidence of the existence of bitumen,* we
cannot doubt that due proportions of those prin-
ciples united, will in the progress of decompo-
sition by the admission of air & moisture pro-
duce the degrees of heat necessary to support
the phenomina of the hot springs. No sulphuric

* Having thrust a stick down into the crater of one of the
hot springs some distance up the hill, several drops of petro-
leum or naphtha rose and spread upon the surface, it ceased
to rise after three or four attempts.

acid

acid is present in this water ; the springs may be supplied by the vapor of heated water ascending from the Caverns where the heat is generated ; or the heat may be immediately applied to the bottom of an immense natural Caldron of rock contained in the bowels of the hill, from which as a reservoir the Springs may be supplied. Therm: at 8^h p.m. 34° Extremes 32° -45°

Therm: 34° Wind N.W. Cloudy — The state Tuesday 25th of the heavens did not admit of any astronomical observations in the morning ; it cleared away before noon, so that we had a good meridian altitude of the Sun, which was scarcely over when the clouds overspread again the face of heaven, & it rained a part of the afternoon : the present being Christmas Day, we indulged the men with a holy-day, for which object they had hoarded up their rations of whisky, to be expended in merriment on this occasion, which terminated with inebriety but no ill consequence ensued. We amused ourselves with farther experiments on the hot waters ; the conduct of the analysis being left to Doctor Hunter as a professed Chemist, the results will be hereafter given. Thermom: at 8^h p.m. 44° Extremes 34° -51°

Therm 34°. Wind N.W. clear. prepare for Wednesday 26th observation

1804 } observation. Took the Sun's contacts in the
 December } morning hoping to get equal altitudes in the
 afternoon ; but as this is not always certain, I
 make it a rule to note down the Sun's altitude,
 so that the apparent time may be calculated ;
 and if the corresponding altitudes are taken
 after noon ; the calculation of the correction
 for change of declination during the interval is
 greatly facilitated by noting the altitudes. Before
 instruments were brought to their present state
 of perfection, the method hitherto in use was
 to be preferred ; but no reason can be assigned
 why we should not now adopt a mode equally
 correct, which saves half the labor, and more
 especially that by using the altitudes, we do not
 require that the Latitude should be previously
 known.

This afternoon took the Altitude of the hill
 west of the camp by measurement of a base
 and two correct angles of elevation with the
 circle of reflection, and found it to be 300 feet,
 which is less than we had supposed : very steep
 hills are extremely imposing ; the ascent of the
 hill was not much more than double its perpen-
 dicular height, i. e. about 700 feet of inclined
 plane and the angle at its base made by the
 summit with the horizon above 26° . We had
 no favorable position to ascertain by the same
 means the height of the hill of the hot springs,
 but having been on the tops of both distinctly
 seen

seen from each other, we judge them to be of equal elevation. { 1804
December

In the morning between 10 and 11^h made a set of Lunar observations, by taking twelve distances of the sun and moon's limbs: the moon being advanced within less than 60° of the sun, appeared with a very faint light in presence of the sun's image altho' darkened considerably, and it required very particular attention to obtain fine contacts, which are supposed to be very correct, altho' the eye remained greatly fatigued. —The afternoon being cloudy prevented taking the correspondent equal altitudes for the regulation of the watch. Therm' at 8^h p.m. 44°. Extremes 34°–50°.

This morning being fine Doctor Hunter pre- Thursday 27th
pared to make his long meditated excursion of 3 or 4 days into the mountains, which the unfavorable state of the weather has hitherto prevented: the therm' stood at 26° before sun rise, and the face of the hill and creek were shrouded in condensed vapor. After breakfast the Doctor set out with our Pilot and three of the people; the rest were dispatched with loads of baggage to the river. Took a set of observations for equal altitudes, but we were again disappointed in obtaining the correspondent afternoon observations by the intervention of clouds; the mornings' altitudes of yesterday and this day will nevertheless
be

1804 } be sufficient for the regulation of time by the
 December } watch and obtaining her rate of going. At noon
 had a very fine altitude of the Sun, which is
 the seventh observation for the Latitude of this
 place, and concludes our astronomical observa-
 tions here, from whence will be deduced (it is
 hoped) with sufficient precision the Latitude
 and Longitude of this point of Louisiana, ren-
 dered remarkable by the presence of so great a
 natural curiosity as the Hot-springs. The mean
 of the seven observations whose respective re-
 sults were all very near to each other makes the
 Latitude of the Hot-spring N° 3 to be $34^{\circ} 30' 59''.82$. This may be farther corrected by in-
 troducing the deviation in north polar distance,
 occasioned by the nutation of the Earth's axis;
 this being common to the Sun and to all the
 Stars ought not to be neglected when great pre-
 cision is required. The series of observations
 above mentioned being reduced to the 21st De-
 cember as the mean or middle time of the
 series; it will be found that the Sun's Right
 ascension was then 9 signs and the place of
 the moon's ascending node 9 signs 27 degrees;
 from whence results a correction in the Sun's
 declination of $-4''.34$ which quantity being ad-
 ditive to the Latitude deduced, gives for the
 true Latitude $34^{\circ} 31' 4''.16$. The Longitude
 will be calculated at leisure & will be hereafter
 noticed.

After

After the Doctor set out I amused myself { 1804
with pursuing experiments on the analysis of { December
the hot waters &c — Thermometer at 8^h p.m.
38° Extremes 26°–45°

Therm: 34° Wind S.W. — Cloudy — ap- Friday 28th
pearance of rain or snow — Dispatched six of
our people with loads to the river Camp : after
breakfast set out upon a geographical tour round
the Hill of the hot-springs ; young M: Hunter
with one of the people and my negro servant
attended: in the course of this survey there was
no indication of any hot spring but those of
which we have already spoken, all lying on the
same side of the hill within a space of 70 perches
as has been already noted: Every new inspec-
tion of those Curious springs brings forth some
addition to the limited knowledge we have ac-
quired of them; we find it now pretty evident
that most of the springs if not all have flowed
from a more elevated part of the hill than at pre-
sent; and the perpetual accumulations of Calca-
reous matter confining the sources have probably
elevated them to nearly the level of the grand
reservoir within the bowels of the hill; during
this process the calcareous rock has been formed
which we now see attached to the side of the
hill; at length however the issues of the waters
have become so obstructed and probably the level
of the water in the grand reservoir so elevated,
that

1804 } that by the superincumbent pressure of the
 December } waters, new passages have been forced in lower
 situations: it is evident that the springs which
 now break forth along the margin of the Creek,
 cannot be supposed to have flowed for a long
 time (comparatively) in their present situation;
 the formation of calcareous rock created by the
 springs in their actual position, resembling only
 small excrescences growing from the base of
 considerable precipices, is a proof of what we
 have advanced: some of those new springs have
 formed small flats of 20 to 30 feet extent; in
 general they have formed little elevations of 5
 to 6 feet perpendicular, with a glaxis of 10 or
 15 feet terminated by a precipitate fall into the
 creek. Those small accumulations when com-
 pared with the great mass of rock spreading
 along the face of the hill to the perpendicular
 height of one hundred feet, are certainly a de-
 monstrative proof of the recent existence of the
 inferior springs: an ingenious observer of Na-
 ture, by some years attention might determine
 the quantity of calcareous matter precipitated
 in a given time from some one spring, which
 would furnish us with a datum, from whence to
 form a proximate calculation of the antiquity
 of the Springs. We have already noticed that
 some springs still exist even at the very limit
 which separates the calcareous region from the
 primitive hill; their temperature is similar to
 those

those below, they are all feeble and are soon lost upon the face of the hill, & perhaps contribute to augment the inferior springs. { 1804
December

We found the circuit of this hill to be about $3\frac{1}{5}$ miles, measuring round its base as correctly as the uneven surface would permit: altho' this hill when seen from the hill to the west of the valley appears to represent a handsome conical monticule in an insulated situation, yet our geographical survey discovered to us that it is connected in the rear by a very narrow ridge, with a chain of inferior hills dividing the Creek of the hot-springs from a branch of the Calfat. We find invariably the upper half of the hills to be filled up with the hardest flinty rocks, with an admixture of the hardest freestone; much of both particularly the first have rolled down & are found all the way to the base: At the foot of those hills & at some elevation are found immense strata of schistus, some of a yellowish color, which forms by decomposition an earth of the same color, presenting at first view the appearance of clay, but it is greatly deficient in tenacity: The base of the hills and the vallies contiguous to the hot-spring hill seem chiefly occupied by a bluish black Schistus, altho' there be veins of the siliceous genus crossing this last in several places: there is no doubt that a manufacture of Alumn might be established here upon an immense scale; the schistus under foot is frequently

1804 } frequently found in a state ready to yield alumn,
 December } as appears from the astringent and sweet taste it
 possesses.

After our return to Camp, I determined to have another microscopic examination of the green matter and hot water before leaving finally this place. I procured some of the green matter of a very beautiful kind, resembling a moss whose fibres were more than half an inch in length; a film of the same green matter was spread upon a calcareous base, & from the film sprung the fibres representing a beautiful vegetation completely immersed in water of 130° temperature; This moss (if it shall be found to be vegetable) was brought to this state of perfection by growing in a small natural bason containing some depth of water in a state of comparative repose, communicating freely with one of the springs, but no current passed thro' it.

This moss sparkled before the microscope with innumerable nodules of lime, some part of which seemed to be beautifully chrystalized, and altho' the fine green color of the moss was visible thro' the lime, yet it was thereby so much concealed, that it was impossible to decide whether it possessed the true organic structure of a vegetable; I incline however now to believe that the green matter is a true vegetable, not only from its great resemblance to some of the mosses particularly the Byssi, but also from the
 discovery

discovery I have just made that this moss is the residence of animal life: after frequent search { 1804
December
I at length discovered a very minute shell-fish of the bi-valve kind inhabiting this moss; its shape is nearly that of the fresh water muscle; the color of the shell is greyish brown with certain spots of a slight purplish appearance; when the animal is undisturbed it opens its shell & thrusts out four legs very transparent, and articulated like those of a quadruped; the extremities of the forelegs are very slender & sharp, but those of the hind legs somewhat broader as if armed with minute toes; from the extremity of each shell, issues 3 or 4 forked hairs, which the animal seems to have the power of moving; the forelegs seem formed for making incisions into the moss for the purpose of procuring access to the juices of the living plant, upon which no doubt it feeds, and I think it highly probable that the animal is provided with a proboscis, tho' I was unable to discover it; the hind legs seem well adapted for propelling the animal in its progress over the moss or thro' the water.

A considerable quantity of snow fell while we were engaged on the survey and after our return. Thermometer at 8^h p.m. 30° Extremes 30°-34° — at 3^h p.m. 32°

Therm: 25° Wind at N.W. strong all night, Saturday 29th some flying clouds appear in the morning. — Got the

1804 } the people ready with their loads between 9 &
 December } 10^h a.m. and I set out with them myself for the
 river camp ; it began to snow at 10 o'clock, but
 did not continue ; the weather continued cloudy,
 but the exercise of walking rendered the tem-
 perature (tho' cold) very agreeable ; the low
 grounds thro' which we passed were a little
 watery, in consequence of the rains which had
 fallen, but not more so, than when we first
 walked out to the hot springs ; the soil of the
 flat lands under the stratum of vegetable mould
 was chiefly yellowish and was evidently decom-
 posed schistus, of which there were immense
 beds in every stage of its progress from the hard
 stone recently uncovered, partially decomposed
 and down to the yellowish earth apparently ho-
 mogenous. The covering of vegetable mould
 between the hills and the river is in most places
 sufficiently thick to constitute a good soil, being
 from 4 to 6 inches, and it is the opinion of the
 people upon the Washita that wheat would grow
 here to great perfection. Altho' the higher hills
 (300 to 600 feet) are very rocky, yet the inferior
 hills and sloping bases of the first are generally
 clothed with a soil of a middling quality, the
 natural productions are sufficiently luxuriant,
 consisting chiefly of black and red oak inter-
 mixed with a variety of other woods and a con-
 siderable undergrowth ; and even on those rocky
 hills, Nature has bestowed a soil which will
 reward

reward the future labors of the industrious Vignerons : Nature herself unaided by man has already planted on them three or four species of Vines, which are said to produce annually an exuberance of excellent grapes. A great variety of plants, some of which in their season, I am informed produce flowers highly ornamental, would probably reward the researches of the Botanist.

{ 1804
December

On the way into the river I took the courses by compass and the distances by time ; when the Doctor comes with the last party I have appointed two good hands to chain the same distances, to be noted down by young M^r Hunter — At 8^h p.m. the therm[°] was down at 24° — the wind blew strong all the afternoon, but fell calm by night.

I omitted to observe in its proper place that having observed from the bottom of one of the hot springs a frequent ebullition of gas, we should have collected some for examination, but no apparatus was provided for the purpose, it was so unfortunate that we had not even a funnel at the Springs, which with a bottle might have sufficed : it was not hydrogen, because I failed in several attempts to inflame it by a lighted torch : there can be no doubt of its being Carbonic acid, having always found indications of an excess of a weak acid, by which the lime and iron were dissolved in the water. With respect to the quantity

1804 } tity of hot water delivered by the springs I made
 December } the following rough estimate. — There are four
 principal springs, two of inferior note, one rising out of the gravel and a number of drippings and drainings all issuing from the margin or from under the rock which overhangs the creek. Of the four first mentioned, three deliver nearly equal quantities, but one (N^o 1) the most considerable of all and the hottest delivers about five times as much as one of the other three, the 2 of inferior note may be equal to one, and all the drippings & small springs are probably underrated at double the quantity of one of the three; that is, taking all together, the whole will amount to a quantity equal to eleven times the water delivered by the standard spring, which was the only one commodiously situated for measurement; I neglect the springs up the hill, because it is probable that what is not evaporated unites with the springs below. We found a Kettle containing eleven quarts was filled by the standard Spring in eleven seconds; Hence the whole quantity of hot water delivered by all the springs issuing visibly from the base of the hill may amount in one minute to 165 gallons and in 24 hours to 3771 ½ Hhds of 63 gallons each, which is equal to a handsome brook and might work an over-shot mill. In cool weather condensed vapor is seen arising out of the gravel bed of the Creek from springs which cannot be taken into the

the account; during summer and fall I am informed the Creek receives little or no water, but what is supplied by the hot-springs, at those seasons probably many small springs may be seen rising out of the bed of the Creek, which are now invisible; during that time the Creek itself is a hot bath, too hot indeed near the springs, so that a person may chuse the temperature most agreeable to himself, by selecting a natural bason nearer to or farther from the principal springs; at 3 or 4 miles below the springs, the water is tepid and unpleasant to drink.

Therm: in air 9° in river water 36° — wind Sunday 30th very light at N.W. This morning & the night past are the coldest we have experienced this winter. The People set off very early to bring in Doctor Hunter's baggage from the springs. Employed myself in bringing up my journals &c — The Doctor arrived with the people about 3^h p.m. — The Sky was most serenely clear this day, its color over head was that of the darkest prussian blue and during last night the stars shone with uncommon lusture. People have conceived an idea that they see more stars here and at the hot springs than any where else; which idea arises from the extreme transparency of the atmosphere, which causes the stars to strike the eye with greater brightness, and no doubt stars of inferior magnitude will be seen in a
pure

1804 } pure sky which are invisible in an ordinary one.
December } This evening some light clouds appeared about the sun-setting, which is an indication of change of weather ; we now anxiously expect rain, as we wait only for the first rise of the river to go down with safety over the falls and rapids ; 5 or 6 feet perpendicular will be sufficient. At night the atmosphere became again extremely bright — at 8^h p.m. the therm^r was at 21°. Extremes 9°–38° — It became very cold at 10^h p.m.

Monday 31st Therm^r in air 29° in river water 36° — Wind S.E. During the night the Weather altered greatly ; the temperature was much molified and the stars disappeared ; in the morning one general cloud enclosed the horizon, and from the damp penetrating chilliness of the morning we look for snow : ordered setting poles to be made & every thing to be prepared for the first favorable moment to depart. The day continued cloudy, & in the afternoon the therm^r having risen to 32° it began to snow and continued all day and part of the night : Examined some of the green moss from the hot-springs, with a view to shew Doctor Hunter one of the Bivalved testaceous animals, found a large one which under the microscope measured $\frac{1}{50}$ of an inch in length by the micrometer.

1805 }
January }
Tuesday 1st } This morning the thermometer was at 26° —
It

It had ceased snowing in the night but recommenced after day light ; the snow was sounded and found in most places to be from 11 to 13 inches ; we are in hopes that the melting of this snow united to the rain which will probably accompany the thaw, will be sufficient to take us down in safety ; being desirous however of ascertaining what aid we had to expect from the snow, I made the following experiment — I took a Cylindric Kettle 10 inches deep & having by sounding found a flat piece of snow of the same depth, I pressed down the Kettle bottom upwards perpendicularly to the ground ; I was thus enabled to return the Kettle completely filled with its column of snow, and having thawed it gradually to the temperature of 33° I found the water to measure exactly 1.07 inches, that is, 9.346 inches of snow will yield one inch of water in the circumstances above mentioned ; it is observable that the snow fell lightly without wind, it is therefore probable that the proportion of ten to one may be adopted as a general standard to be varied according to circumstances. The snow continued frozen all day, and the therm^t at 3^h p.m. did not fall below the freezing point and in the evening at 8^h p.m. it was fallen to 18°

Thermometer in air 6° in river water 32° Wednesday 2^d
 Calm — The night proved extremely cold ;
 large

1805 } large fires with all the covering that could be
January } conveniently used were necessary to render our
situation comfortable in a bad tent negligently
chosen at New Orleans. The sun arose bright
and shone with splendor upon the surface of
the snow which covered every object upon the
ground; the river alone presented a bleak ap-
pearance with a condensed vapor floating upon
its surface; the temperature of the river was at
the freezing point; a kettle of water being
brought up to Camp and placed on the ground
four feet from a large fire, its surface began im-
mediately to shoot into icy chrystalizations. —
Our hunters are tolerably successful, bringing in
every day abundance of Venison and Turkies. —
The day became pleasant and agreeable, the
temperature at 3^h p.m. being 45° and at 8^h p.m.
the thermometer fell to 32°

Thursday 3^d Thermometer in air 22° in river water 34° —
wind moderate at N.W. The atmosphere be-
came cloudy in the night and we looked confi-
dently for a change of weather, but this morning
it has become serene and fine; the vicissitudes
of the weather have of late been frequent, a
change is now extremely desireable but the sea-
son seems obstinately bent against all change.
The day became pleasant and of an agreeable
temperature, the thermometer at 3^h p.m. being
at 48° and at 8^h in the evening 30°

Thermometer

Thermometer in air 22° in river water 36° — { 1805
Calm — during the night it became cloudy, not { January
a star was to be seen but before morning it { Friday 4th
cleared away & became perfectly serene and
cloudless. The day proved fine, the sky over
head of a bright but deep prussian blue, the tem-
perature mild, the thermometer at 3^h p.m. be-
ing up to 50° In the afternoon the Doctor made
an excursion upon the river to examine some
of the neighbouring hills: I continued to bring
up and arrange my Journals. The evening was
fine, the thermometer at 8^h p.m. was at 32° —
no favorable appearance yet of rain to raise the
river; the snow is disappearing without produ-
cing any beneficial effect: we continue here as
prisoners, waiting for what is usually called bad
weather, to bear us away from this place.

Thermometer in air 22° in river water 36° Saturday 5th
Wind N.W. The atmosphere became cloudy in
the night, but was perfectly serene and clear at
day-break, so that we have no near prospect of
our departure. The day became fine and seemed
to invite us to recommence astronomical obser-
vations, and altho' a sufficient series had been
made both for Latitude and longitude at the
hot-springs connected by survey with this place,
yet we began a new series. Equal altitudes of
the sun were taken before and after noon;
three distances of the moon and sun's limbs
were

1805 } were taken near 2^h p.m. and in the evening
January } three distances of the moon's west limb from
Aldebaran were taken between 6 & 7^h p.m. —
a greater number would have been taken, but
in the first case the Sun got behind some trees
and in the second case, the moon was in a similar
situation, if tomorrow proves fine we shall
prosecute the same operations to more advantage,
having ordered several trees to be cut down
which stood in the way — Wind S.E.

The day continued fine and of a mild temperature;
some few clouds keep up our hopes of a change —
Thermometer at 8^h p.m. 28° — Extremes 22°–55°

Sunday 6th Thermometer before sun-rise in air 28° in river
water 38° This morning proved cloudy contrary
to expectation and revived our hopes of a change
of weather favorable to our descent: This state
of the atmosphere continued all day; from time
to time there was a little light rain or mist.
The rain increased a little after dark, but still
very light: the snow seems now melted away to
about one fifth or sixth of the original quantity;
we began to apprehend that the whole would
disappear without any influence upon the river,
but now it has risen about 12 inches: Thermom-
eter at 8^h p.m. 44° Extremes 28°–50°

Monday 7th Thermometer in air 64° in river water 44°
Last

Last night it rained very lightly by intervals, so { 1805
little indeed that a cylindric vessel placed to re- { January
ceive it, did not contain enough to be measured.
During the night the temperature was extremely
warm, and the weather continues to be cloudy,
but not very dark, so that our prospect of rain
is not very flattering; the river has nevertheless
risen 18 inches since last night, which has no
doubt been caused by the melting of the snows.
The sun shews himself at intervals between the
clouds: it became so warm that we dined abroad
under the shade of lofty pine and oak trees, upon
the wild game of the forest and the river, such
as Venison, wild Turkey, bear, Cygnet &c: The
thermometer at the hour of dinner was at 75°
which at this season produces the sensation of
a summer's sun of 90° ; the river continues to
rise, and we have taken the resolution to wait
the issue of the present state of the weather and
to set out at all events; if there be not water
enough to go over the falls with safety by the
oar, we shall pass along by letting ourselves down
by the help of a rope, step by step, until the
danger is passed. Thermometer at 8^h p.m. 38°
Extremes 38° – 78° : In the evening the river con-
tinues to rise.

Thermometer in air 28° in river water 46° Tuesday 8th
Last night was cloudy, moist and cold, the river
rose considerably in the night; we suppose it to
be

1805 } be about 6 feet perpendicular, higher than the
 January } level of the river when we came up, we now
 think ourselves secure of going down with speed
 and safety; orders were therefore given to em-
 bark our baggage and prepare for departing. We
 had the satisfaction of taking with us an abun-
 dance of fresh provision chiefly venison, to supply
 us to the Post of the Washita. We accordingly
 set off between 9 & 10 o'clock and landed a
 little below upon the opposite shore and went
 to examine the first rapids, which we found to
 be very safe; we re-embarked, and by directing
 our course between the breakers, passed along
 with the rapidity of an arrow in perfect secur-
 ity: we continued moving with great rapidity
 on the face of the current, but thought it pru-
 dent to land and view a second rapid, and after
 exploring the best passage we passed down in
 perfect safety.

We got over the great 'Chutes' about 1
 o'clock, two of our oars having been violently
 dashed overboard by the willows, the Pilot
 thinking it safest to keep the eastern shore on
 board; we halted below and regained our oars
 by sending up the Canoe. There we dined and
 went on & stopped a little below to examine
 the flinty promontory already noticed on the 3^d
 December. We took some specimens of the rock
 resembling the Turkey oil-stone: it appears to
 me to be too hard; I remarked that the strata
 of

of this chain ran perpendicularly nearly East and West, crossed by fissures at right angles 5, 6 to 8 feet apart; the laminæ were from $\frac{1}{4}$ to 4 or 5 inches thick. About a league below on the same side, landed at Whetstone hill and took several specimens; this projecting hill consists of a mass of greyish blue schistus of considerable hardness and about 20 feet perpendicular; near the top, it was in a state of progression towards decomposition, being there extremely crumbly and part of it changing into a dirty yellowish color: the laminæ were in general perpendicular, but not regularly so, and from $\frac{1}{4}$ to 2 inches in thickness, but did not split asunder with an even surface: went on and encamped about ten leagues below Ellis' Camp. Thermometer at 8^h p.m. 37° Extremes 28°–37° It rained lightly after we encamped, which rendered the flat ground of our encampment very wet and the wood difficult to burn.

Thermometer in air 42°, in river water 44° Wednesday 9th
 — The river fallen about six inches — During the night it rained by intervals, but very lightly, the air was moist and cold, the soil here immediately under the vegetable stratum is yellowish and of little consistency, resembling greatly the understratum observed near the hot springs, produced probably by the same cause, the decomposition of schistus. Last evening ordered provisions

1805 } provisions to be dressed for the day, to save the
 January } time of landing during the day for that purpose;
 about two miles below our Camp landed to examine some freestone and blue slate in sight of 'Bayou de la Prairie de Champignole' mentioned the 2^d Dec^r. The freestone of which we took specimens, seems proper for grindstones, scythe-stones &c; but the blue slate as it is called is only bluish schistus, hard & brittle; and not proper for the roofing of houses; we have not seen slate good for that purpose except some discovered on one of the Doctor's excursions on the Bayou Calfat. Much game on the river, such as Geese, ducks, swans &c; they continue equally wild and difficult of approach as before, so that we derive little benefit from that source.

The day continued dark, cloudy & cold with the wind at North; at 11^h a.m. it began to snow and hail with rain by intervals: we observed nothing this day meriting remark, different from what we saw on our way up. Towards evening it began to clear away; and soon after we encamped the sky became serene. By the Pilot's estimation we made this day nineteen leagues, which probably do not exceed forty miles: we passed five of our night encampments on the way up. Encamped a league above 'Cache à Maçon' —slept a little higher on the 27th Novem^r. Thermometer at 8^h p.m. 24°, Extremes 24°–42° at 3^h.

3^h p.m. 36° The moon and stars shone with uncommon lusture. { 1805
January

Thermometer in air 23°, in river water 42° — Thursday 10th
river fallen 7 inches. The face of the heavens changed much in the night, it became extremely dark and cloudy, and this morning with the wind at north; it is cold, damp and penetrating; the river fallen seven inches during the night. After setting out, the clouds began to dissipate & the sun to shew himself, a very agreeable sight to travellers in cold & unpleasant weather; it continued never-the-less cold all day, the sun not possessing power to soften the rigorous cold which prevailed, the thermometer not rising above the freezing point from morning until night. We made this day by the Pilots account fourteen leagues and encamped at 'auges d'Arclon' (Arclon's troughs) three leagues below the little misouri; slept near this place on the 23^d november: it appears by reference to the Journal, that we were thirteen days in going up from this place to Ellis' Camp, which has required but three broken days to come down, having made several stops to examine certain objects on our way down, and to day we made a more considerable delay at the Camp of a M. Le Fevre. This was an intelligent man, a native of the Illinois, now residing at the Arkansas; he is come here with some Delaware and other
Indians

1805 } Indians whom he has fitted out with goods, and
January } receives peltry, fur &c at a stipulated price, as it
is brought in by the hunters. This gentleman informs us that a considerable party of the Osages from the Arcansa river have made an excursion round by the prairies towards the red river, and down the little misouri as low as the 'fourche d'Antoine', and there meeting with a small party of Cherokees, are supposed to have killed four of their number & others are missing ; Three Americans and ten Chicasaws went a hunting into that quarter, who may also have been in danger, those Ozages being no respecters of persons. M. Le Fevre possesses considerable knowledge of the interior of the Country ; he confirms the accounts we have already obtained that the hills or mountains which give birth to the various sources of this little river are in a manner insulated ; that is, they are entirely shut in and enclosed by the immense planes or prairies which extend beyond the red river to the South & beyond the Missouri (or at least some of its branches) to the north and range along the eastern base of the great chain or dividing ridge, commonly known by the name of the sand hills, which separate the waters of the Mississippi from those which fall into the western pacific ocean : The breadth of this great plane is not well ascertained, it is said by some to be at certain parts or in certain directions not less than

than two hundred leagues, but I believe it is { 1805
 agreed by all that have a knowledge of the { January
 Western Country, that the mean breadth is at
 least two thirds of this quantity ; a branch of
 the Missouri called the river platte or shallow
 river is said to take its rise so far south, as to
 derive its first waters from the neighbourhood
 of the sources of the Red and Arcansa rivers.
 By the expression planes or prairies in this place
 is not to be understood a dead flat resembling
 certain savannahs, whose soil is stiff and impene-
 trable, often under water & bearing only a coarse
 grass resembling reeds; very far different are the
 western Prairies, which expression signifys only
 a country without timber: Those Prairies are
 neither flat nor hilly, but undulating into gently
 swelling lawns and expanding into spacious val-
 lies in the center of which is always found a
 little timber growing upon the banks of brooks
 and rivulets of the finest water, the whole of
 those prairies is represented to be composed of
 the richest and most fertile soil ; the most luxu-
 riant & succulent herbage covers the surface of
 the Earth interspersed with millions of flowers
 and flowering shrubs of the most ornamental
 and adorning kinds: Those who have viewed
 only a skirt of those prairies, speak of them with
 a degree of enthusiasm as if it was only there
 that Nature was to be found in a state truely
 perfect; they declare that the fertility and beauty
 of

1805 } of the rising grounds, the extreme richness of
 January } the Vallies, the coolness and excellent quality
 of the waters found in every valley, the Salu-
 brity of the atmosphere and above all the gran-
 deur and Majesty of the enchanting landscape
 which this Country presents, inspires the Soul
 with sensations not to be felt in any other region
 of the Globe. This Paradise is now very thinly
 inhabited by a few tribes of savages and by im-
 mense herds of Wild Cattle (Bison) which peo-
 ple those countries; the Cattle perform regular
 migrations according to the seasons, from south
 to north, and from the planes to the mountains;
 and in due time taught by their instincts take
 a retrograde direction: those tribes move in the
 rear of y^e Herds and pick up stragglers & such as
 lag behind, which they kill with the bow and
 arrow for their subsistence; should it be found
 that of this rich and desireable Country there is
 500 miles square, and from report, there is prob-
 ably much more, the whole of it being cultiva-
 ble, it will admit of the fullest population, and
 will at a future day vie with the best cultivated
 & most populous countries on the Globe: in
 this particular the province of Holland exceeds
 perhaps all others; there, one million of acres
 support two millions of Inhabitants; but as Mar-
 itime Countries enjoy superior advantages re-
 specting population, by the interchange of their
 manufactures for the necessities of life, which
 last

last in an inland country must be totally drawn from the product of the proper soil, we shall suppose this new Country to be populated in the proportion of one tenth only of that of Holland, in which case it will be capable of subsisting a nation composed of twenty six millions of Souls. This Country is not exposed to be ravaged by those sudden and impetuous deluges of rain which in most hot countries and even in the Mississippi Territory, do sometimes tear up & sweep away with irresistible fury the crop and the soil together; on the contrary, rain is said to become more rare in proportion as the great chain of mountains is approached, and it would seem that within the sphere of attraction of those elevated chains little or no rain falls upon the adjoining planes; this relation is the more credible, as in that respect our new Country may resemble other flat or comparatively low countries similarly situated, such as the Country lying between the Andes and the Western pacific: the planes are supplied with nightly dews so extremely abundant as to have the effect of refreshing showers of rain, and the spacious vallies which are extremely level may with facility be watered by the rills & brooks which are never absent from those situations: such is the description of the better known country lying to the south of the red river, from Nacodoches towards St Antonio in the province of Texas:

1805 } Texas: * the richest crops are said to be pro-
January } duced there without rain, but agriculture in that
quarter is at low ebb; the small quantities of
maize furnished by the Country, is said to be
produced without cultivation, a rude opening is
made in the earth just sufficient to deposit the
grain at the distance of four or five feet in
irregular squares, and the rest is left to nature;
the soil is naturally tender, spongy and rich, &
seems always to retain humidity sufficient with
the bounteous dews of heaven to bring the crops
to maturity.

The red and Arcansa rivers whose Courses are
very long pass thro' portions of this fine Coun-
try, they are both navigable to an unknown dis-
tance by boats of proper construction; the Ar-
cansa river is however understood to have greatly
the advantage over its neighbour with respect
to the facility of Navigation: some difficult
places are met with in the red river below the
Nakitosh, after which it is good for 150 leagues
(probably the computed leagues of the Coun-
try of nearly 2 miles each) there the Voyager
meets with a very serious obstacle. viz the com-
mencement of the Raft as it is called, that is,
a natural covering which conceals the whole
river for an extent of 17 leagues continually aug-
menting by the drift wood brought down by

* The x is pronounced gutturally, precisely in the same
tone as the Scotch pronounce the gh in night, light &c

every

every considerable fresh; this covering which { 1805
for a time was only drift wood, supports at this { January
time a vegetation of every thing abounding in
the neighbouring forest, not excepting trees of
considerable size, & the river may be frequently
passed without any knowledge of its existence;
it is said that the annual inundation is opening
for itself a new passage thro' the low grounds
near the hills, but it must be a long time be-
fore Nature unaided will dig out a passage suffi-
cient for the reception of the waters of the red
river; about 50 leagues above the natural bridge
is the residence of the Cadeaux or Cadadoquis
Nation, of whose good qualities we have already
spoken; the Inhabitants estimate the Post of
Nakitosh to be half way between New Orleans
and the Cadeaux Nation: above this point the
red river is said to be embarrassed by many
rapids falls and shallows, none of which are
said to be met with in the Arcansa river as high
as it is known, except in the very lowest state
of its waters; the navigation is reported to be
safe and agreeable, the lands on either side are
of the best quality & well watered with springs,
brooks & rivulets, & many situations proper
for mill-seats; from the description it would
seem, there is along this river a regular grada-
tion of hill and Dale presenting their extrem-
ities to the river; the hills are gently swelling
eminencies and the Dales are spacious Vales with
living

1805 } living water meandering thro' them: the forests
January } consist of handsome lofty trees, & chiefly what
is called open woods, without cane-brake or
much underwood; the quality of its lands is sup-
posed much superior to that of the red river,
until it ascends to the Prairie Country, where
the lands are probably very similar. About 200
leagues up the arcansa, is an interesting place
called the salt Prairie, there is a considerable
fork of the river there, and a kind of Savannah
where the salt water is continually oozing out &
spreading over the surface of a plane; during the
hot dry Summer Season, the salt may be raked
up into large heaps; a natural crust of a hand-
breadth in thickness is formed when the dry
season prevails; this place is not often approached
on account of the danger from the Ozage In-
dians; much less do the White hunters venture
to ascend higher where it is generally believed
that silver is to be found. We have been also
informed that high up the arcansa river, salt is
to be found in form of a Solid rock, & may
be dug out with the Crow-bar. The waters of
the Arcansa like those of the red river, are not
potable during their low state; they are both
charged highly with a reddish earth or marl
and are also extremely brackish; this incon-
venience is not greatly felt upon the Arcansa, where
springs, rills & brooks of the finest fresh water
are so frequent; the red river I believe is not

so favorably situated. Every account seems to demonstrate that immense natural magazines of salt must exist in the great chain of mountains to the westward, all rivers flowing from those mountains during the dry season retain a strong impregnation of salt, until that property becomes imperceptible by the accession of the fresh waters of many other rivers. — The great western prairies, besides the herds of wild Cattle (Bison commonly called Buffalo), are also stocked with vast numbers of a species of wild goat, (not resembling the domestic goat) extremely swift of foot; as the description given of this goat has not been very perfect, I have supposed from its swiftness, it might be the antelope; or it may possibly be a goat which has escaped from the spanish settlements of new Mexico: I have conversed with a Canadian who has been much with the Indians to the westward, this man told me that he had seen great flocks of an wool-bearing animal larger than common sheep; the Wool is much mixed with hair. This is probably the same animal which has been described & of which a plate has been given in the medical repository of New York. The Canadian pretends also to have seen an unicorn; the single horn he says rises out of the forehead & curls back, according to his description so as to convey the idea of the fossil Cornu Ammonis; this man says he has travelled beyond the great dividing ridge

{ 1805
January

1805 } ridge so far as to have seen a large river flow-
January } ing to the westward; the great dividing moun-
tain is so lofty that it requires two days to ascend
from its base to its top, other ranges of inferior
mountains lie before and behind it; they are
all very rocky & sandy, large lakes and vallies
lie between the mountains; some of the lakes
are so large as to contain considerable islands,
and rivers flow from some of them: great num-
bers of fossil bones of very large dimentions are
seen among the mountains, which the Canadian
supposed to be of the Elephant; he does not pre-
tend to have seen any of the precious metals, but
has seen a mineral which he supposed might
yield Copper: from the top of the high moun-
tain, the view is bounded by a curve as upon the
ocean and extends over the most beautiful prai-
ries which seem to be unbounded particularly
to the East; the finest of the lands he has seen
are on the Missouri, no other can compare in
point of richness and fertility with those of that
river.

This Canadian as well as M. Le Fevre say
that the Osages of the tribe of white hairs in the
month of December (early in the month), plun-
dered all the white hunters and traders upon the
arcansa river. All the old french hunters agree
in accusing the Osages of being extremely faith-
less, particularly those on the arcansa, the others
they say are but very little more to be depended
upon;

upon; they pretend to make peace & enter into terms of amity, but on the first favorable occasion, they rob, plunder and even kill without hesitation, The other indian tribes speak of them with great abhorrence, and say they are a barbarous uncivilized race. The different nations who hunt in their neighbourhood, have been concerting plans for their destruction.

M. Le Fevre informs me that the Nation of the arcansas always waging a defensive war with the Osages, propose sending in the spring of the year a deputation of three Chiefs to the Government of the United States. They say that the Country from the Washita river on the south to the river St Francis on the north is their property, that they propose to say to the Government of the U. S. "We will relinquish to your people all our lands to the North of the arcansa river, on the white river and on the river St Francis; we will also relinquish our lands upon the mississippi lying between the rivers arcansa and Washita to an extent west-erly far beyond any settlements which have been attempted by the white people, the limits of which we will ascertain; but we request that the powerful arm of the U. S. will defend us their children in the possession of the remainder of our hunting grounds, lying between the Arcansa and Washita rivers." —

Thermometer at 8^h p.m. 19°, Extremes 19°—32°

1805 } 32° The Moon & Stars shine with uncommon
January } splendor.

Friday 11th Thermometer in air 11°, in river water 39°
River fallen 4½ inches. Wind moderate at North.
The morning is fine, the sky perfectly serene,
but the air very cold and penetrating: passed
the petit ecor à Fabri, the osier which grows
abundantly upon the beaches above is not seen
any lower upon this river, and at this place we
begin to see the small tree called 'Charnier'
which grows only at the water side, and is to be
seen all the way down the Washita below this
place, the Latitude here is about 33° 40' which
is the limit Nature seems to have placed to those
two vegetables, one on the north & the other to
the south.

I have already remarked in my Journal of
the 17th November that we saw no long moss
(Tilandsia) above Latitude 33° & conjectured
that Nature had limited its vegetation to that
parallel; having this circumstance in my recol-
lection, I asked M. Le fevre for information re-
specting its existence at the Arcansa settlement,
which is known to be not far beyond 33° of
Latitude; he informed me that about ten miles
to the south of their settlement the growth of
the Tilandsia is limited, & that so curiously as
if a line had been drawn East and West for the
purpose, as it ceases all at once & not by degrees;
hence

hence it would appear that Nature herself has marked with a distinguishing feature the line which Congress has thought proper to draw between the territories of Orleans and of Louisiana. It is a question of curiosity at what Latitude the limit of the *Tilansia* is found in the atlantic states, and also the Cypress, which last upon this small river is not found higher than 34° of latitude, it is believed to be much higher on the Mississippi: our maps represent a Cypress swamp on the confines of the states of Maryland & Delawar, in Latitude $38^{\circ} \frac{1}{2}$ at the sources of Pocomock River. Q. Is it the same species of Cypress which is found in the Carolinas, Mississippi Territory &c?

The weather continued clear & very cold all day, we landed at the Cadaux path to make a fire and dine, the Thermometer at 3^h p.m. 32° and at 8^h p.m. it fell to 26° —Encamped $1 \frac{1}{2}$ league below 'petite pointe coupée', being nearly the same place where we found the latitude on the 21st November to be $33^{\circ} 29' 29''$; having made by the pilot's reckoning about 15 leagues; we stopped twice to day, which has retarded us nearly two hours; our rate of going has been about $2 \frac{1}{4}$ of those leagues p^r hour.

Thermometer in air 20° , in river water 40° Saturday 12th
—river risen an inch. Much vapor ascending from the river. Part of the night was cloudy
and

1805 } and this morning the heavens are not entirely
January } cloudless, we therefore expect an approaching
change of weather. The air is damp and penetrating so that it continues yet very cold on board the boat; as the day advanced, it proved more cloudy and disagreeable and altho' at 3^h p. m. the thermometer was found at 43°, the sensation of cold to the human body was greater than in a dry air at 22° — the face of the heavens was overspread with clouds & the atmosphere extremely moist: we made a good encampment in the evening called 'Campement des bignets' (fritter camp) being about 18 of the Pilots leagues, tho' not much exceeding two days of our voyage up, about 37 or 38 miles by our own reckoning; we passed this place between breakfast and dinner on the 19th november. The Thermometer at 8^h p. m. 30°

Sunday 13th Thermometer in air 27° in river water 40° — river risen 1½ inches — Calm. The morning is very fine and the atmosphere dry, consequently the temperature not cold to the human body. These two mornings the river has risen a little, notwithstanding that we have been without rain for several days past, & it will be remembered that the three first days of this voyage, the river was found each morning to be fallen; this is to be accounted for by the boat gaining upon the velocity of the stream more
in

in the day than it loses in the night. Since we have got below the rapids, the current is much more gentle and we make only two of the Pilots leagues p^r hour, which does not exceed perhaps 4 english miles, it appears that in nine hours (one day's) rowing down we have made the same distance which we made in 13 hours coming up, the current at the time of our ascent being nothing, and the space passed over 36 miles, it will be found from these data that in each 24 hours we gain upon the Current $6\frac{1}{4}$ miles; we have therefore reason to conclude that we have got beyond the apex of the tide or wave occasioned by the fresh, & are descending along an inclined plane, but as we always encamp at night, it is not surprising that in the morning we find ourselves in deeper water because the Apex of the tide is constantly endeavouring to overtake us, and in the morning we find ourselves on a more elevated part of the inclined plane, which we had left behind us the evening before.

This morning no condensed vapor was visible on the surface of the river, yesterday it was considerable; hence it appears that 13° difference of temperature (the river being highest) does not condense vapor with sufficient rapidity to render it visible, altho' 20° are more than are necessary; it must not be omitted to be mentioned that this morning the atmosphere was extremely dry, and therefore greedy of moisture,
and

1805 } and yesterday it was very moist, and consequently
January } not disposed to dissolve water rapidly. The day
proved cool, tho' not disagreeably so; the wind
in the afternoon N.E. and air moist: Made
this day by the computed distances about $15\frac{1}{2}$
leagues and encamped about one league below
where we found our Latitude to be $33^{\circ} 13' 16''.5$
on the 17th November, so that we have again
completed two days voyage ascending in one
descending. Thermometer at 8^h p.m. 30° Ex-
tremes $27^{\circ}-53^{\circ}$

Monday 14th Thermometer in air 23° , in river water 40° —
river risen $1\frac{1}{2}$ inch. Wind very light at N.W.
The atmosphere is dry and the temperature
to the human body seems not very cold; there
is a thin condensed vapor upon the surface of
the river, the difference of temperature between
the river water and air being this morning 17° ;
yesterday the atmosphere being nearly in the
same state 13° were insufficient to render the
vapor visible. If our hygrometers were instru-
ments of a less dubious nature, and capable of
indicating by a scale the absorbing, dissolving or
attracting power of the atmosphere for water,
without being influenced by heat and cold we
should then be able to determine à priori at
what difference of temperature between water
and air corresponding to a given degree of the
hygrometer, ascending vapor will be visibly con-
densed.

densed. A green moss is found upon the branches of trees which are immersed in the waters of the inundation, none of the same species appears in a more elevated situation ; when the waters subside vegetation does not seem entirely at a stand in those mosses which are but a foot or two above the surface, they continue to be of a lively green & hang to the length of 5 or 6 inches : the vegetation of this moss must commence under water ; it may be of the same nature with the green matter deposited in fresh water conduits which has been examined by Priestly & others, & which here has arrived to a higher state of perfection from its free & open situation ; it is evident this moss must vegetate under the impulse of a considerable current.

In the afternoon passed Latitude 33° and the Island of Mallet noticed in the Journal of the 15th of November : made about 19 leagues this day, being about $2\frac{1}{2}$ day's voyage ascending ; since we have got into the low alluvial Country the channel is narrower and the velocity of the current greater ; we are now encamped where we passed in the afternoon of the 14th November. The day continued fine and of an agreeable temperature ; at 3^h p.m. the thermometer was at 53° , at 8^h p.m. 32° . An eclipse of the moon will take place this night after midnight, we prepare to observe it ; regulated the watch as near as possible to the apparent time at the setting

1805 } setting of the Sun ; to-morrow we shall give an
January } account of our observations, the sky is perfectly
serene.

Tuesday 15th Thermometer in air 30° in river water 40°
— no vapor visible on the surface of the river:
river risen 1½ inch—wind light at S.E. cloudy.
Prepared last evening to observe the Eclipse
of the Moon, with a very indifferent Spy-glass
magnifying about 8 times. The commence-
ment of the Eclipse was not correctly noted,
occasioned by the very strong effect of the pe-
numbra in our perfectly serene & clear sky, the
moon not being far removed from the Zenith,
which induced a belief that the Eclipse had
actually commenced at 12^h 32', this circum-
stance produced some inattention at the instant
of the true commencement, which was supposed
to have happened at 12^h 40'; but the com-
mencement of total darkness was observed with
due attention, and is believed to be as correct
as circumstances with our instruments would
admit, and took place at 13^h 37'. It is believed
that the uncertainty of the moment of observa-
tion did not exceed half a minute, I am rather
disposed to say a quarter of a minute, for the
transparency of the atmosphere was as perfect
as can ever be expected in situations not more
elevated than ours. We shall ascertain the error
of the watch below at some known point, whose
latitude

latitude & position can be deduced by reference to our geographical Journal, & this we shall again perform on our arrival at the post of Washita, from which we shall gain the rate of the watch's going & the whole may be referred to the meridian of the Post & will serve to compare with the results of our lunar observations made there on our way up.

This morning the heavens are veiled by clouds; during the night the thermometer was down to 28° with a pure serene sky and the atmosphere so dry that the cold was not very sensible; this morning with a higher temperature and moist air, it is cold and penetrating. We saw this morning the first long moss (*Tilandsia*) called generally by the french 'barbe espagnole' (spanish beard) on trees growing on the margin of the river about $2\frac{1}{2}$ leagues (5 miles) above the 'Bayou des Butes.' At this time also we emerge from the alluvial country noticed in the former part of this Journal; the banks are now of a good elevation, about 15 to 18 feet above the present level of the river & probably not liable to be inundated, whereas the alluvial lands we have just quitted, are subject to be overflowed from 8 to 12 feet; we saw none of the green moss along the alluvial tract, which I much regret, having intended to take some specimens for examination, I am in doubt whether any of the same species grows below, as yet
we

1805 } we do not see it at the 'bayou des butes.' The
January } Sun at last broke forth and we landed to take
his altitude for the correction of the watch,
the position was recognized by the mouth of a
Creek, so that by a reference to the geographical
Journal, we found that the Latitude of this
point is $32^{\circ} 49' 24''$, being the same which
will correspond with N 10° W $8^h 8\frac{1}{2}'$ on the
14th nov: ascending; the Sun's dble Alt: lower
limb was $66^{\circ} 36' 45''$ Ind: err: $+12' 20''$ taken
at $10^h 56' 24''$ a.m. — The day became cloudy
in the afternoon and the thermometer rose to
 63° which we consider as an indication of
rain.

We made this day nearly 15 computed leagues,
being the eighth day from Ellis Camp, and are
now encamped within five of those leagues from
the post of the Washita, being about a mile above
the place where we dined on the 12th November,
Latitude then found was $32^{\circ} 34' 47''$. The
moon and stars shine with a mild lusture, no
appearance of change in the weather notwithstanding
the increased temperature of the atmosphere.
Thermometer at 8^h p.m. 43° .

Wednesday 16th . . . in river water 41° — river risen $1\frac{1}{4}$
inch: a . . . proceeding from atmospheric
moisture, being very different from what we see
arising out of the river under considerable differences
of temperature — Arrived at the Post of
Washita

Washita about noon — The day proved very fine and warm, the thermometer at 3^h p.m. being at 65° and at 8^h p.m. it remained at 60° — Found all well at the post — no news of any importance — our people all in good health except one Soldier who has been a good deal incommoded by a dysentery; but he is not in danger. Returned the hired boat.

Thermometer in air 60° in river water 44° — Thursday 17th river risen one inch. Wind at S.W. — very clear during the night but cloudy this morning — made the following observation to correct the watch and ascertain her rate of going. At 8^h 53' 7" Sun's apparent double altitude of the lower limb 36° 44' 45" Ind: err: + 12' 30".

Employed the people in getting Mast and Oars for our large boat. Judging it of importance to get to Natchez as soon as possible, I determined after being disappointed in procuring horses, to take the Canoe with one Soldier and my own Domestic, and push down to Catahoola, from whence there is a road to Concord about 30 miles across the . . . [page torn].

Set off about day-break, and arrived after night at the lower settlement, about 20 computed leagues from the Post. Called at the house of an old hunter with whom I had conversed on my way

1805 } way up: This man informs me that at the place
 January } called the mine on the little Misouri, there is a
 smoke, which ascends perpetually from a particular place, and that the vapor is sometimes insupportable; the river or a branch of it passes over a bed of mineral, which from the description given is no doubt martial pyrites. In a creek or branch of the Washita called 'fourche à Luke'* there is found on the beaches and in the cliffs a great number of globular bodies, some as large or larger than the head of a man, which when broken, exhibit the appearance of Gold, Silver and precious Stones; this most probably is pyrites with chrystalized spar: also at the 'fourche des glaises à Paul',† there is near to the river a cliff full of hexagonal prisms terminated by pyramids, which appear to grow out of the rock, some an inch in diameter & six to eight inches long: there are beds of pyrites found in several small creeks communicating with the river Washita: but it appears that . . . [page torn] indications on the Misouri were most considered, because some of the hunters actually worked upon it & sent a parcel of the ore to New Orleans as observed above: it is the belief of the people here that the mineral contained precious metal, but that the Spanish Government did not chuse that any mine should

* 3 leagues above Ellis' Camp.

† higher up the river than 'fourche a Luke.'

be opened so near to the British Settlements, for { 1805
 which reason an express prohibition was issued { January
 against any farther work being done upon the
 mine; since which time it has been no more
 spoken of. This man procured me some small
 roots & a few seeds of the patate à chevreuil; he
 also took me to the next house where I saw
 a solitary tree of the ' bois d'Arc ' (bow-wood)
 or yellow wood, which was raised from a seed
 brought from the little Missouri; I requested
 some large branches, but could only obtain
 from the Old Lady mistress of the place, two
 very small ones; the fruit fallen before maturity
 lay upon the ground, some were of the size
 of a small orange, with a rind full of tubercles;
 the color tho' in appearance faded, still retained
 a resemblance to pale gold: the tree in its native
 soil when loaded with its golden fruit (nearly
 as large as the Egg of an Ostrige), presents I
 am told the most splendid appearance; its fo-
 liage is of the finest deep green greatly resem-
 bling the varnished foliage of the orange tree,
 and upon the whole no forest tree can com-
 pare with it in respect . . . ental grandeur.
 The bark of the young tree which I saw resem-
 bled in its texture externally the Dogwood
 bark; but its color is a reddish or brownish
 yellow; the appearance of the wood recom-
 mends it for trial as an article which may yield
 a yellow die: I hope to succeed in raising trees
 from

1805 } from the cuttings and a small Cion which I
 January } have procured; the people suppose this tree too
 young to mature its fruit, as it has always hith-
 erto fallen when of the size of an orange, I am
 inclined rather to suspect that the failure may
 be occasioned by its open and exposed situation,
 as it naturally grows under the shade of the for-
 est, this tree is about six inches in diameter, it
 is deciduous and appears to be in a sound and
 healthy state; the branches are numerous and
 full of short thorns or prickles, it seems to re-
 commend itself as highly proper for hedges or
 live fences, which are greatly wanted in many
 parts of the United States: this tree is known to
 exist near the Nakitosh (perhaps Lat: 32°) and
 upon the river Arcansa high up (perhaps in Lat:
 36°), it is therefore probable it may thrive from
 Lat: 28° to 40° and will be a great acquisition
 to a great part of the U. S. should it possess no
 other merit than that of being ornamental.

On my way down I endeavoured to discover
 a place said to produce Gypsum, but being with-
 out a proper guide I failed in the research; I
 have no doubt of its existence, and have taken
 notes of the positions of two places where it has
 been found; one of which is the first hill or
 high land which touches the river on the west
 above the large Creek called Bayou Calumet
 and the other is the second high land on the
 same side; as those are two points of the same
 continued

continued ridge, it is probable that an immense body of Gypsum will be found in the bowels of the hill connecting those two points and perhaps extending far beyond them; it has been said that fossil coal is found on the east side of the river opposite to the second hill; it is probably Carbonated wood only: a person who pretends to have been up among the sources of the Washita 100 leagues higher than the hot springs, declares having found true mineral coal, which burns with a strong heat and bright flame without the aid of other fuel, a property which Carbonated wood does not possess. I do not give entire faith to this last report, the person who informed me being fond of the marvellous.

Continue my voyage with contrary winds and arrived the evening of the 22^d at the Catahoola, which by computation is fifty leagues from the post of Washita: At this place a french man named Hebrard is settled, who keeps a ferry across the black river: here the road from Natchez forks, one branch of it leading to the settlements on the red river and the other up to the Post of the Washita: The proprietor of this place has been a hunter and great traveller up the Washita & into the western countries; he confirms generally the accounts we have received; it appears from what he and others say, that in the neighbourhood of the hot-springs, higher

{ 1805
January

{ Monday 21st
and Tuesday
22^d

1805 } higher up among the mountains, and upon the
January } little misouri, during the summer season, Explosions are very frequently heard proceeding from under ground, and not rarely a curious phenomenon is seen which is termed the blowing of the mountains, that is, confined elastic gaz forces a passage thro' the side or top of a hill driving before it a great quantity of earth and mineral matter : it appears that during the winter season the explosions and blowing of the mountains entirely cease, from whence we may conclude that the cause of those phenomena is comparatively superficial, being brought into action by the increased heat of the more direct rays of the summer-sun.

Upon my arrival at the house of M. Hebrard, I enquired for horses to carry me across the low country to Concord opposite to Natchez, the distance by the road is computed 30 miles, but it is probable the direct distance falls short of 25, and it is remarkable that the river Washita preserves a kind of parallelism to the Mississippi until it comes within the influence of the highlands of the arcansa, & thence it is deflected to the North west & probably holds a middle ground between the red river and the arcansa ; the inclination of the mississippi is such that the walnut-hills are 30 miles to the east of the Natchez, the Post of the Washita will be found therefore nearly under the same meridian with
that

that of Natchez very contrary to the general idea. — M. Hebrard very obligingly engaged to furnish me with horses, which it was necessary to hunt up in the woods; In the meantime I went to view the Indian mounts spoken of in the beginning of this Journal; I find this to be a very interesting place, it is the point of confluence of three navigable waters viz The Washita river, The tenza and the Catahoola, the second communicates with the missisipi lowlands by the intervention of other creeks and lakes & by one in particular called the Bayou d'argent which enters into the mississippi about 14 miles above Natchez, during high water there is navigation for batteaux of any burthen along those bayoux, a large lake called St John's lake occupies a considerable part of this passage between the Mississippi and the Tenza; it is in a horse-shoe form, & has been at some former period the bed of the Mississippi, the nearest part of it is about one mile removed from the river of the present time; this lake possessing elevated banks similar to those of the river has been lately occupied & improved; many similar possessions and improvements have been made since the first news of the cession of Louisiana by the french to the American Government; I omitted to mention in its proper place that it is understood, that even the hot-springs included within a tract of some hundreds of acres were granted by the late

{ 1805
January

1805 } late Spanish Commandant of the Washita to
January } some one of his friends, but it is not believed
that a regular patent was ever issued for that
place, & it cannot be asserted that residence
with improvement can be set up as a plea to
claim the land upon.

The Catahoola bayou is the third navigable
stream ; during the time of the inundation there
is an excellent communication by the Lake of
that name & from thence by large Creeks to
the red river ; The Country around the point
of union of those three rivers is altogether allu-
vial ; but the place of M. Hebrard's residence
is no longer subject to inundation for reasons
which have been already assigned ; there is no
doubt that as the country augments in popula-
tion and riches, this place will become the site
of a commercial inland town, which will hold
pace with the progress and prosperity of the
country. On this place are to be found a num-
ber of indian mounts, one of which is of very
considerable elevation, with a species of rampart
surrounding a very large space which was no
doubt the position of a fortified town ; having
taken some notes respecting this place, the whole
will be digested and introduced into an Appendix
which will be added to this Journal.

Wednesday 23^d This morning is cloudy and threatens rain,
the horses are not found, therefore no prospect
of

of setting out to day; a little rain fell about 9^h { 1805
a.m. — in the afternoon one of the horses only { January
is found.

Last night there was much thunder and light- Thursday 24th
ning and this morning the rain falls very fast:
Having no other employment I endeavoured to
collect information, here I met with an Amer-
ican who pretends to have been up the Arcansa
river 300 leagues; the navigation of that river
he says is good to that distance for boats drawing
3 or 4 feet water: I do not give implicit faith
to this man, when he speaks largely of the silver
which he pretends to have himself collected upon
that river, and even says that on the Washita 30
leagues above the hot springs he has found silver
ore so rich that 3 lib of it yielded one of silver, &
that this was found in a Cave: he asserts also that
the ore of the mine upon the little Missouri was
carried to Kentucky by a certain Boon, where it
was found to yield largely in silver: This Amer-
ican says he has also been up the red river, that
there is a great rapid just below the raft or natu-
ral bridge & several others above it: The Cadaux
Nation is 50 leagues above the raft, and near to
their Village commences the Country of the
great Prairies, and extend 4 or 500 miles west to
the sand mountains as they are termed; those
great planes extend south far beyond the red
river; north over the Arcansa river and among
the

1805 } the numerous branches of the Missouri. This man
January } confirms the accounts of the beauty and fertility
of the western Country &c. —

This evening the other horse has been found
so that I hope to set out tomorrow morning.

Friday 25th The horses being late of fetching up, we set
out only at 9 o'clock; the weather was cloudy
but not cold; the meeting of three rivers here
which form the black river, has given it a consid-
erable width at this place, little short I think of
400 yards. There is no apparent current here
and the river is rising very fast, which is attrib-
uted to the Mississippi flowing up into the red
river. The rain which has fallen these two days
past, has rendered the roads extremely wet and
muddy; we made only one league in the hour;
arrived at the bayou Crocodile at 2^h p.m. This
place is considered half way from the black river
to the Mississippi, & is one of those creeks which
are extremely numerous in the low grounds &
serve to assist in venting the waters of the inun-
dation: the whole of the Country thro' which
we have passed to day appears to be subject to
the annual inundation; there are some places
higher than others upon which Canes are found
growing, the margins of water courses are always
found more elevated than the lands at some dis-
tance, which degenerate into Cypress swamps
and lakes.

At

At this place we found the waters of the Mississippi had already flowed in so abundantly, that there was a necessity to prepare a raft for crossing, & having in company three white men who understood the business, the raft was prepared of logs of the driest wood we could procure lashed together with our horse ropes and halters; after two hours delay we got to the other side of the bayou which was about 60 yards wide including the overflowed low margin of the Creek; we had yet 5 leagues to make & it was already 4 o'clock; we pushed on, but the roads were little better than mud and water for several miles together; we were unable to get on fast enough to pass over this bad part of the road before it became extremely dark, and we expected to be obliged to spend the night in the woods without fire, perhaps without a spot of dry land to rest upon: it was difficult to preserve the path; in this respect we trusted chiefly to the sagacity of our horses, at length they brought us out of the woods & at 9^h p.m. We got to a new settled plantation four miles short of Concord, where we were hospitably entertained with good homely fare, particularly milk, of which I had not seen a drop upon the Washita, not even at their principal settlement; In those new Countries and all over the Opelousa Country, the Horned Cattle are in a semi-savage state, no provision is made or laid up for them during winter; in the fall of the

{ 1805
January

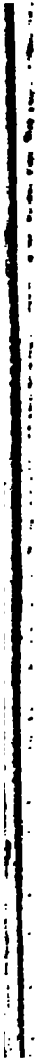
1805 } the year it is therefore necessary to turn out the
January } Calf with the Cow, otherwise she would abandon her young in the hands of its owner where it would infallibly perish; the Cattle move off in search of winter food & the proprietor frequently knows nothing of the situation of his stock, untill the warm weather of the Spring & Summer season calls them out in search of the young tender herbage of the open fields.

Saturday 26th Set out in the morning with a very cold freezing air; I now think it extremely fortunate that we were not detained last night in the woods, as we certainly should have spent a very disagreeable night. Arrived in an hour at Concord; the settlement of this place has commenced only since the treaty of limits between the U. S. and Spain, but it has received its most considerable augmentation since the cession of Louisiana to the U. S. by citizens of the Mississippi territory who have either established their residence altogether upon newly acquired lands; or what has perhaps been equally common, have taken up tracts of land under the authority of the Spanish Commandant & have gone to the expense of improvements either in their own names or in the names of others before the 20th of December 1803 hoping thereby to hold their new possessions under the Sanction of the law. Exclusive of the few actual residents on the banks of the
Mississippi

Mississippi, there are two very handsome lakes { 1805
in the interior, on the banks of which settle- { January
ments of a similar nature have been made.

Crossed the ferry and breakfasted at Natchez
and arrived at my own house at ten o'clock
where I had the satisfaction to find my family
all well.

JOURNAL of a Geometrical Survey
commencing at St. *Catherine's* landing
on the East shore of the *Mississippi*
descending to the mouth of the red
river, and from thence ascending that
river, the black river and river of the
Washita as high as the Hot Springs in
the proximity of the last named river.



Preamble

THE distances are taken by time from a portable chronometer, and proportioned by a log-line divided into perches, run out for half a minute : consideration was always had for the velocity of the Current by deducting it immediately from the rate per log, when it merited attention : it is to be understood that the rate per log noted, continues the same untill it is again noted with change.

All meridian or other altitudes of the Sun above the horizon, noted in the following Journal, are to be understood of the lower limb, unless otherwise expressed.

An excellent Circle of reflection with a triple Index, made by Troughton of London graduated to 10" of a degree, was used for taking altitudes, lunar distances &c ; this Circle is supported on a pedestal which gives it a solidity & perfection never to be expected from any instrument held in the hand ; the index error was regularly ascertained immediately after taking a meridian altitude, by observing the Sun's contact with his reflected image both above and below : for facility in practice the greater contact was added to the apparent double altitude when the index error was additive ; and the lesser contact was added when the error was subtractive ; which includes the Sun's semi-diameter and the correction of the index error giving at once the apparent double altitude of the Sun's center, being careful to subtract the correction of refraction from the altitude of the lower limb only : altho' this was my

practice, I have agreeably to custom given always the Index error : some small differences will be found in calculating the Latitudes, arising from my practice, of preferring the Suns semidiameter taken from my instrument (generally smaller) to that found in the nautical almanack, M^r. Maskelyne astronomer royal has long since observed that the Sun's diameter as taken from Mayer's tables is 3'' too much, I observe that this error is corrected in the almanac for 1805.

The rate of going of the Chronometer having been frequently changed by being carried in the pocket, it was not proposed to depend upon its keeping the Longitude otherwise than as a good second hand watch to note the instance of astronomical observations, and was always preserved carefully in a horizontal position untill a connected series of observations was completed, during which time it is believed that the rate of going was sufficiently equable.



Journal of a Geometrical Survey commencing at S^t Catherine's landing on the East shore of the Mississippi descending to the mouth of the red river, and from thence ascending that river, the black river and river of the Washita as high as the Hot Springs in the proximity of the last named river.

THE following courses and distances from S^t Catherine's landing to the mouth of the red river were taken on the return of the boat at the termination of the voyage, but are now placed with more propriety at the commencement of the survey.

South 210 perches.

S 70 W 1212at 810 Hootsell's plantation on the right 1 ½ mile above the Island.

S 30 W 120 passed between the Island and right bank.

South 240

S 40 E 210

S 30 E 240

S 20 W 930

S 60 W 240

West 492

S 35 W 282

S 20 W 189

S 5 W 1470 At 1418 passed Homochilo river on the left.

S 40 E 528

S 20 W 600

S 50 W 540

S 20 W 420

S 60 E 595

S 75 E 925 At 805 Buffalo river on the left; arrived at Fort adams.

S 30 W 2250 At 1940 the Line of demarcation on the left 31° North Lat : & $6^{\text{h}} 6'.42''$.
Long: West of Greenwich; the last by M. DeFerrer.

S 60 W 40

N 65 W 160

N 15 W 360

N 40 W 312

N 60 W 120

N 85 W 960 to the mouth of Red river.

RED RIVER

ARRIVED at the mouth of the Red river the { 1804
 evening of the 17th of October: The Latitude { October
 and Longitude of this place having been accurately
 ascertained by Doctor Jose Joakin de Ferrer, we did
 not think it necessary to lose any time on that account
 — Lat 31° 01' 15" North, and Long: 6^h 7' - 11" west
 of Greenwich — proceeded to take the Courses and
 distances of the Red river as follows, beginning at the
 mouth of the river on the right margin.

Thursday, 18th

N 14° E 0^h 23' to a point on the same side: rate
 p^r: Log 4 per: p^r: half minute, no
 opposing Current. River 550 yards
 wide.

N 8 W -.47 to a point on the left side.

N 20 W -.23 to a point, right bank.

N 5 E -. 5 along shore. River 300 yards wide.

N 22 E -.22 to a point left side — a Creek to
 the right.

N 10 W -. 9 along shore. Rate of going 4 per.

N 25 W -. 6 . . . d°.

N 45 W -.11 a lake on the right side.

N 80 W -.22 to point right side.

N 40 W -. 4 — river 250 yds wide.

N 10 W -. 4 — no sensible current.

N 32 E -.17 to a p^r: on the left 200 y^ds wide.

N 25 W -.11 to a p^r: on the right.

1804 }
 October } N. 10 W -.16 to a p^t on the left.
 N. 15 W -. 6 to a p^t on the right.
 N. 25 W -.27 to a p^t same side, a bend to the
 right.
 N. 38 W -. 7 along shore.
 N. 40 E -.20 d^o
 S 75 E -.42 to a p^t on the left.
 N 40 E -. 7 along shore.
 N 5 E -.41 to a p^t on the right.
 N 40 E -. 6 to a p^t on the left — a large Creek
 on the right.
 N. 80 W -.24 to a p^t on the right.
 N. 10 E -.13 along shore.
 N. 75 W -.23 along shore.
 S 85 W -.16 d^o
 N 75 W -.19 d^o
 S 50 W -.46 to a point on the right. Made this
 day 12 Miles, 296 perches.
 Friday 19th Thermometer before Sun rise 46°
 N 75 W 0^h:19' to a point on the left. Rate 7
 perches per $\frac{1}{2}$ Minute.
 Same course 0.27 to do. on the right.
 N 30 W 0.30 along shore.
 W 0.11 . . . d^o
 N 60 W 0.14 a point on the left: rate of going
 7 perches per $\frac{1}{2}$ Minute.
 W 0.23 along shore.
 Same course 0.26 a point on the right.
 N 75 W 0.33 along shore.
 N 50 W 0.26 to a point on the left: at 5' a Creek
 on the left.
 N 70 W 0.22 a point on the right; wind contrary
 hove the log rate of going 4
 perches.

BLACK RIVER

9

N 35 W 0.22' along shore.

N 10 W 0.13 a point on the left, landed to ob- { 1804
serve and dined. { October

Face of the Doub. ap. alt. \odot lower limb $97^{\circ}0'$ —

Circle West 0'' In: er: $-13' 21''.5$ Lat: found
 $31^{\circ}15'-48''$.

N 60 W 0.40 a p' on right . . rate 5 perches.

N 50 W 0.20 along shore to the mouth of black
river 150 yds wide, red river the
same width; entered Black river.

N 35 E 0.25 a point on the left.

N 10 E 0.31 along shore.

BLACK RIVER

N 40 W 0.16' along shore. river 100 yards wide.

S 75 W 0.20 to a point on the right: sounded
20 feet, black sand, encamped for
the night; made this day 15 miles
102 perches.

Saturday 20th Thermometer before Sunrise 47° .

W 0.30 along shore — hove the Log, 4
perches per $\frac{1}{2}$ min.

N 45 W 0.45 to a point on the right — tempera-
ture of the river 73° .

N 10 W 0.28 to a point on the left — Chalybeate
spring, temperature 66°

N — 0.16 along shore.

Same course 0.42 to a point on the right $6\frac{1}{2}$ perches
per log.

N 20 W 0.30 along shore rate of going 4 perches
per log.

1804 }
October }

N 50 E 0^h30' along shore river 80 yards wide —
Canes on the right.

E 0.10 to the left shore landed to observe
at noon & dine.

Face of the ☉ doub: mer: ap: alt: 95°-34'.
Circle East 5''. In: er + 13'-32''.5—Lat found
31° 22' 46''.6.

S 75 E 0.58 to a p^t on the right & continue to the
left—Log 4½ perch per ½ Minute.

N 63 E 0.47 to a point on the right and continue
to a point of the left; Thermom-
eter at 3^h 80°.

N 25 E 0.40 along shore—Canes on the right.

N 45 W 0.27 along shore.

S 80 W 1. 6 . . ditto; encamped for the night.
Soundings 5 fathoms, black sand.
This day's voyage makes 13 miles
40 perches.

Sunday 21st last } Thermometer before sun rise 60°
course continued } a little cloudey near the Horizon.

S 80 W 0.48 along shore.

N 45 W 0.51 to an Island; rate per log 4½
perches.

N 13 W 1. 3 hoist sail, rate per log 8 perches:
cane brake, little settlement.

N 20 E 0.25 to a point on the left. Rate per log
4½ perch.

N 25 W 0.14 to a point on the right.

N 40 E 0. 6 to the left; landed to observe and
dine, clouds came over just at the
moment before the Sun came upon
the meridian, went off in a little
time, he had dipped: the double
alt: is 94° 37'. 0''.

BLACK RIVER

11

In' er : + 13'. 34" which is too small, { 1804
the latitude is too far north. { October

N 75 E 0.40' along shore.

N 40 E 0.22 ditto Thermometer 83°

S 30 E 0.23

Same course 1. 6 (sent the men to track) along shore,
rate per log 5 perches.

S 13 E 0.46 continue tracking; cross and go on
to a point on the left.

N 75 E 0.35 to the right—encamped for the
night. Extremes of the Thermom-
eter 60° to 83° cloudy; wind S.S.E.
made this day 14 Miles 59 perches.

Monday 22 — Thermometer before Sun rise 65°
Wind S.S.E. cloudy, rain before
day.

Continued

N 75 E 0.20 to a point on the right.

S 65 E 0.35 along shore — by log 5 perches per
½ Minute.

E 1.14 to a point on the left, cloudy.

N 0.30

Hoist sail

N 40 W 0.18 to a point on the left — by Log 8
perch's per ½ Minute.

Wind fails

W 2.12 to a point on the right — by Log
4 perches, long reach, rain at noon,
no observation.

N 20 W 0.35 along shore — Thermometer 79°

N 40 E 1. 3 to a point on the left — by Log 5
perches.

N 10 W 0.19 along shore.

N 45 W 0.20 to a point along shore — sounded

1804 }
October }

3 $\frac{1}{2}$ fathom, black sand — extremes
of the thermometer 65° to 79° made
this day 13 Miles 76 perches.

Tuesday 23^d Thermometer 68° before sun rise.

Wind N.N.W. the river fell 3
inches in the night.

N 65 W 2^h 5' along shore by log 5 $\frac{3}{4}$ perches.

N 10 W 0.50 to a point on the right.

N 10 E 0.38 along shore contrary wind — by
log 3 $\frac{3}{4}$ perches observed \odot Doub:
alt: 92° 58'.45". In: Er: +13'.

dinner

45".5.

continue

N 10 E 0.50 along shore.

WASHITA

N 30 E 0^h15' to the left shore, wind N.N.W. ar-
rived at the mouth of Catahoola,
West course; thermometer 75°.

N 10 E 0. 8 the mouth of Washita: Bayu Tensa
forks with Washita bearing N 80°
E: log 5 $\frac{3}{4}$ perches.

N 65 W 0. 7 along shore on the right: encamped.
Extremes of the thermometer 68°—
75° took information at the mouth
of the Catahoola which detained us
2 $\frac{1}{2}$ hours; sounded, 6 fathoms;
made this day 9 miles 77 $\frac{1}{2}$ perches.
By our reckoning the mouth of
Washita is distant from the mouth
of Red river 77 miles 57 perches;

and by the old estimation 32 french leagues. } 1804
October

Wednesday 24 Thermometer before sunrise 54°
Wind North, cloudy, temperature
of the river 71° no current worth
estimating.

N 65 W 0.9 continued to the right shore — rate
of going per log 4 1/2 perches.

N 35 E 0.23 along shore.

N — 0.20 ditto — high land on the right.

— W 0.12 ditto, by log 5 perches. Bayu Ha-
ha on the right coming in f^a East.

N — 0.12 ditto, oblique strata of clay, some
dipping under y^e horizon 30° in the
direction of the river.

N 60 E 0.11 to the left shore.

breakfast

N 30 E 0.27 along shore by log 5 perches
cloudy.

N 45 W 0.13 ditto, river 80 yards wide.

W 0.18 to a point on the right luxuriant
vegetation, grapevines, &c in rich
dark festoons.

N 30 W 0.6 along shore.

N 30 E 0.3 clearing up — wind north.

N 50 E 0.19

N 0.49 landed on the right to observe ☉

dinner Doub: alt: 92° 4'. 50" In: = er:
+ 13'. 45" land high no appearance
of overflowing, oak forest, white,
red, black, rich shrubbery. Lat:
found 31° 42' 30".5.

continued

N 0.42 to the right shore.

1804 } N 55 W 0.31 rich herbage along shore.
 October } N 40 E 0.11 along shore — low and small timber, upon the high bank.
 N 70 E 0.17 along shore }
 E 0.17 ditto } continue taking all
 N 45 E 0.5 ditto } day rate per log 5
 N 0.8 ditto } perches.
 N 60 W 0.83 ditto }
 W 0.9 }

S 72 W 0.24 to the left — a large bayu going to S. W. called Barchelet.

N 15 W 0.39 made this day 14 miles 48 perches.

Thursday 25 Thermometer 49° temperature of the river 68° Wind North, cloudy.

contin^d

N 15 W 0.20 at 12'. pine point on the left, and Villemont's prairie on the right, per Log 4 perches.

N 45 E 0.3 to a point on the right — high land.
 E 0.43 at 3'. bayu on the left.

N 20 E 0.29 to Bayu Louis on the right, here commences the rapids.

Breakfast.

N 1 mile so many shoals in this course that no time or log could be kept — by estimation we went one mile and then were completely embayed, being enclosed by a bar of gravel and sand with only 8 to 12 inches of water; cloudy, no observation; This day we made only 3 miles 120 perches.

Friday 26 Thermometer 40° Wind N.W. light clouds took

WASHITA

15

At 10^h42'. A. M. ☉ sp. dble alt: 82° 9'. 10'' In: er: + 13'. 48'' to regulate the watch. { 1804
At 11 .20.45 Do 88.10 . 5 Magnetic Azim: { October
S 20¹/₄ E.
At noon took the ☉ mer: alt: (doub) 90° 30'. 10''
In: er: + 13'. 48''. Lat. 31° 48'. 57''. 5. thermometer at 3 o'clock 70°

Saturday 27th Thermometer 32° temperature of the river 64° wind North, clear above — a fog on the river. no observation all our efforts being employed to get through a gravelly bar untill 1 o'clock; the rapids continuing occasioned frequent stops so that we could only estimate the remainder of this course at ³/₄ of a mile; the rocky pass which completed the rapids being 200 yards from the end of this last course.

Course continued }
North } ³/₄ mile

—— W 0^h15' to a point on the right — per log 4¹/₂ perches.

N —— 0.38 at 11 a bayu on the left — a point on the left: encamp: extremes of the thermometer 32°–73°: this day made 2 miles 77 perches.

Sunday 28. Thermometer 40° temperature of the river water 63° wind N.W. — clear above — fog on the river.

N 45 W 0.17 rate by log 4¹/₂ perches.

N 0.17 at 5'. a prairie or natural meadow on the left to a point on the left.

N 15 W 0.13 Bayou Boeuf on the right at 5'. Rocky hill on the right.

N 45 W 0.17

N 15 E 0.18

N 70 W 0.20

1804 } S 55 W 0^h10' on the right— here we made the
October } following observations

A. M. ☉ doub : alt : 53° 19'. 00''. at 9^h— 5'—16''. — Mag : As : S 60 E }
do 58 . 14 . 10 at 9^h 20 —28. d^o. S 57 E }

In : Er : + 13'. 58.

Apparent distance of the Sun and Moons nearest limbs 53° 24'. 50''.

In : Er : + 13'. 58''. at 9^h 47'. 28½''.

Same course 0.6 on the right, tracking the boat ; by
log 5 perches.

W 0.14 ditto.

N 10 E 0.14

N 10 W 0.17

W 0.17

S 10 W 0.11 To the right. landed to observe.
dinner ☉ ap : doub : alt : 88° 58'. 45''. In :
er : + 13'. 58''. Lat : found 31° 53'.
35'' . 5.

Contin^d

S 10 W 0. 8

S 78 W 0. 8

S 80 W 0.10

N 30 W 1. 8 a large prairie or savannah on the
right — thermometer 78° at 3^h the
plane is named " Prairie noyée."

S 45 W 0.32

N 45 W 0.13 to the left.

N 80 W 0.31

S 45 W 0.15

S 30 E 0.16 rate by log 5½ perches.

S 82 W 0.12 to the encampment. Sounded, 3
fathom, mud and sand, made this
day 12 miles 116 perches.

Note the rate of going of the
watch to be ascertained from the

morning altitudes of the Sun of this day and the 26th { 1804
October

In future I have determined to take down the distances by the hour and minute as first placed upon the slate or blotter, being less liable to error; the differences as above stated may be taken afterwards at leisure.

Monday 29th Thermometer 41° temperature of the river water 62° wind N.W. fog on the river.

Set out at 6^h22' rate per Log 5½ perches.

S 32 W 6.31

N 35 W 6.40

N 65 W 7. 8

W 7.20 to the right bank.

N 45 W 7.30 to the left.

N 55 E 7.48 a Creek on the left: landed and made the following observations of the distances between the nearest limbs of the sun and moon.

A. M.	{	At 8 ^h 57'.10'' dis: 41°58'.20''	In: Er: + 13'.45''
		9. 6.10 . . . 41.55.40	
		9.26.18 . . . 41.50.10	
		Took the following doub: alt: of the Sun and azimuth.	
		At 9 ^h 47'. 46'' doub: alt: 68° 44'.30''	
		Sun's magnetic Az: S 45° E.	
		In: Er: the same + 13'. 45''.	

Set off at 10^h 4'.

N 55 E 10.20 rate per log 5½ perches.

N 30 W 10.31

N 15 E 10.43

1804 } — W 11^h 1'
 October } N — 11. 7
 N 45 E 11.41
 — W 11.47 took the \odot mer: ap: doub: alt:
 88° 10'. 00" In: Er: +13'. 45"
 Lat: found 31° 58'. 2".

dinner 1.12 p.m.

Contin^d W 1.19

N 25 W 1.42

N 65 W 2. 4 to the left.

N — 2.35

N 45 W 2.46

N 85 W 3.15 rate per log 6 perches thermom-
 eter 85°

N — 3.25

N 85 E 3.58 lost 4'. Cliffs and pine woods,
 soil thin greyish sandy loam.

N 80 W 4.14

N 45 W 4.32

S 55 W 4.55 Wind S.W. Log 5 perches.

W 5.13

N 35 W 5.28

N 55 E 5.35 to the right encamped. Soundings
 3 fathom, thermometer 62°

Note. The watch having been
 suffered to run down last night,
 the times of the altitudes of this
 day have consequently no connec-
 tion with the former. This day
 made 14 miles 65 perches.

Tuesday 30th Thermometer 47° temperature of the
 river water 60° fog on the river
 wind W.N.W. clear.

Set off at 6. 5

N 75 E	6 ^h 26'	rate per log 5 perches.	{ 1804 October
N 20 E	6.34		
N 70 W	7.10		
S 50 W	7.35	lost 2'.	
	W	7.50	
Breakfast		8.47	
N 10 W	9.12		
N 40 E	9.25		
N 82 E	9.47		
N 68 W	10.25		
S 50 W	10.55	wind W.	
N 50 W	11. 7		
N —	11.14		
N 60 E	11.34	landed and took the Suns mer: doub: altitude 87° 16'. 10'' In: er: + 13'. 20'', some uncertainty at- tended this observation; the alti- tude observed may have been a minute too small, which would place the latitude $\frac{1}{4}$ minute too far north; it is however recorded with this remark latitude found 32° 5'. 24''.	
Set off at	1.20		
N 50 W	2. 8	rate per log 5 perches.	
N 30 E	2.35		
N 45 W	2.42	wind W.	
— W	2.48		
S 60 W	3.37	lost 9'.	
N 55 W	4. 7	lost 4'. a rapid: river 30 yards wide.	
N 60 E	4.28		
N —	4.34		
— W	5.15	lost 14' creek on the left, perhaps Bayu Calumet.	

1804 } N — 5^h25' to the left — encamped extremes
October } of the thermometer 47°–83°. Made
15 miles 150 perches.

Wednesday 31 Thermometer 44° river water 62°
Wind N.W. Clear.

Set out at 6.30

N 45 E 6.50 strong current, rate per log re-
duced, 2 perches.

N 20 W 6.55

S 65 W 7.46 lost 5'.

N 40 W 8.10 got upon a shoal: breakfasted.

Set off 9.58

N 40 W 10.44 lost 10'

N 10 W 11.18

N 25 E 11.35 per log 4 $\frac{1}{4}$ perches: landed and
took the Suns apparent: mer:
double alt: 86° 27'. 10'' In: er:

dinner +13'. 40'' latitude found 32° 10'.
13'' at seting out got upon a bar
which detained us.

Set out again

at 2.00 got over the bar.

N 25 E 3.00 lost 6'. per log 4 perches.

N 74 W 3.10 a small plantation on the right.

S 25 W 3.35 Thermometer 84°

— W 3.40

N 5 W 4. 8

N 35 W 4.45 to a small plantation — another
joining below: this day made 6
miles 165 perches.

November } Thermometer 48° river water 62° calm
Thursday 1st } clear.

W $\frac{1}{2}$ mile. The first part of this
course could only be estimated by

the eye, as a great part of this morning was employed in getting over a rapid, which we effected about 12 (noon) it may be put down at half a mile. { 1804
November

Set off after dinner } 2:20'

continu'd W 2.33 rate by log 3 perches against a current.

N 40 W 3.12 a cliff 100 feet crowned by pines, lost 14'. this course upon a shoal.

N 30 E 3.14
E 3.42 lost 2'.

N 30 E 3.44 rate per log $4\frac{1}{2}$ perches.

N 15 E 3.54 Thermometer 85°

N 45 E 4.36 lost 22' upon a shoal.

N 25 E 4.40

W 5.24 a sand bar half way across: river 50 yards wide.

N 70 W 5.44

N 5.50

N 45 E 5.55 at 8^h thermometer 64° extremes 48°-85° made this day 4 miles 115 perches.

Friday 2^d Thermometer 48° river water 62° light clouds; wind S.S.E. a little fog on the river.

Set off at 6.50

N 45 E 7.16 rate per log $4\frac{1}{2}$ perches.

N — 7.23

N 65 W 7.30

S 55 W 8.26 lost 3'.

breakfast 9.19

W 10.00 lost 20' on a shoal.

1804 } N 55 W 11.54' lost 1½ hour on a log under
November } water.

N 10 E 12.30 lost 7' on a shoal.

N 15 W 12.53 landed to dine.

Set of at 2.25 got immediately upon a log and
after getting off set out again at
4.00 Thermometer 84°

N 75 W 4.14

N 25 W 4.30

N — 4.37 a cliff and pine hill on the left.

N 85 E 4.50

S 80 E 5.23

N 30 E 5.39 lost 4'.

N 45 W 5.50 encamped at a sand bar on the
right made this day 8 miles 104
perches.

Saturday 3^d Thermometer 52° river water 64° light
clouds.

Set out at 6.19

N 45 W 6.34 by log 4½ perches.

N 22 W 7.12

N 40 E 7.22

S 70 E 8.10 lost 25' on a shoal.

breakfast

Set out at 9. 8

S 70 E 9.42

S 40 E 9.47

S 10 E 10.00 lost 3'.

S 40 E 10. 5 rate per log 5 perches.

S 75 E 10.11 wind E S E.

N 10 E 10.34 lost 5'.

N 50 E 10.47

E 11.00

S 45 E 11. 8

11^h15' stoped by a shoal.
 S 10 E 11.23 went ashore & prepared to ob- { 1804
 serve. { November

Set out after 1.31 ☉ ap: do: alt: 84° 18'. 40. In:
 dinner. er: +13'. 30''. Lat: 32° 17'. 17''.

Set out at 1.31 after dinner.

S 10 E 1.38
 S 60 E 1.45 towing the boat rate 5½ perches.
 N 60 E 1.55
 N 30 E 2. 4
 N — 2.17
 2.32 stop upon a shoal.

N 20 W 2.45
 N — 3. 5 lost 3'. thermometer 86°.
 N 45 W 3.25 lost 10'. rate per log 4½ perches.
 S 65 W 3.57 lost 14'. upon a shoal.
 N 45 W 4. 3
 N 20 E 4.20 lost 8'. — towing, rate per log 5½
 perches.

N 45 E 4.35 current — rate 4 perches.
 N — 5. 5 lost 9'.
 N 45 E 5.15 encamped on the left, Thermome-
 ter at 8^h p. m. 72° made this day
 11 miles 140 perches.

Sunday 4th Thermometer 54° river water 64° clear.

Set off at 9.18 got aground in the morning.

N 45 E 9.26 rate per log 4 perches.
 N 25 E 9.36
 N 20 W 9.44
 N 45 W 10.26 lost 16' upon a shoal.
 S 75 W 10.50 lost 3'.
 N 65 W 11.00
 N 50 W 11.29 landed and observed the ☉ ap:
 mer: alt: double 83° 33'. 45''.

1804 }
November }

In: er: 13'. 32". Lat: 32° 21'.
10".

Set out at 1^h36'

N 20 W 3.25 lost 57' upon a shoal rate per log
2 perches.

Same course

N 20 W 4.00 lost 12' got out the tow line to
track; per log 5 $\frac{1}{2}$ perches.

N 20 E $\frac{1}{2}$ mile this course being over
shoals and rapids could only be
estimated by sight made this day
4 miles 233 perches.

Monday 5th Thermometer 52° river water 62° heavy
fog, had to unload two turns of
our canoe to get over a shoal.

Set off at 9.55

Last course

Cont^d 10. 4 rate per log 5 perches.

N 20 W 11.15

N 45 W 11.21 lost 3'.

— W 11.32 dark misty and cloudy.

N 45 W 12.00 lost 5'.

N 45 E 12.13

N 25 E 12.42 lost 2'.

N 45 E 1.34 lost 10'.

N 10 W 1.43 wind N.W. dined.

Set off at 3.00

N 75 W 3.12 rate per log 6 perches.

S 50 W 3.55 Thermometer 68° Sun shines
dimley through a blackish mist.

— W 4. 2

N 60 W 4.25 lost 2'.

N 30 W 4.39

N — 4.55

WASHITA

25

N 35 W 5^h 8'
 N 15 W 5.25 encamped on a sand bar on the right made this day 11 miles 276 perches. { 1804 November

Tuesday 6th Thermometer 45° river water 64° heavy fog, wind west.

Set out at 6.32

N 80 E 6.48 rate per log 5½ perches.

S — 7.10 lost 1'.

S 45 E 7.30

E 7.40

N 65 E 7.55

Breakfast 8.57

Contin^d

N 65 E 9.42 rate per log 4½ perches.

N 35 E 9.55

N 45 W 10.28 lost 5'.

N — 11.13 lost 3'.

N 40 W 11.18

S 65 W 11.30 landed and observed ☉ apparent double altitude 82° 5'. 33". In : er : + 13'. 30". latitude found 32° 28'. 58".

Dinner 1.30

Cont^d

S 65 W 1.52 rate per log 5 perches.

S 60 W 2.00

N 10 W 2. 6

N 15 E 2.20

E 2.25

S 55 E 2.47

N 70 E 2.52

N — 2.55

N 25 W 3.25 arrived at the post of Washita.

1804 }
November }

made this day 9 miles 257 perches amounting in the whole from the mouth of Red river 196 miles and 256 perches.

Wednesday 7th Took the \odot ap: mer: doub: alt: 81° 28'. 00" In: er: +13'. 33".5 latitude found 32° 29'. 52".5.

The place where the observation was made is about 450 feet to the south of the post where Lieut: Bowman and his garrison are stationed, the latitude of the post is therefore 32° 29'. 57".

8th & 9th Both cloudy days remained at the post.

9th Thermometer 42°-72° river 61°.

Saturday 10th Thermometer 40° made the following observations.

				by cal.
				var?
				found
A. M.	10 ^h 0'. 18".	\odot ap. dble		
	lower limb Alt 63° 5'. 50"	\odot mag: As S 46 E	In: er:	10° 9'.
	10. 12. 15 65. 56. 53	S 43 E	+13'. 47".5	10 .8
	10. 16. 18 66. 50. 34	S 42 E		10 .8

\odot Ap: mer: dble: Alt: 79° 45'. 3"
In: er+13'. 47".5 Lat: found 32° 29'. 35".

There is a difference of 17". between the Lat: found this day and on the 7th I give the preference to the observation of this day, because on the 7th some interruption from visitants occasioned a moments inattention and it is believed the Sun might have dipped a little before the altitude was taken.

☉ triple contact as follows

{ 1804
November

P M. { Lower limb a 3-1-6 } ☉ ap : D : Alt : 49°. 15'. 30''.
Center 3-2-50 In : er : +13'. 47''. 5.
Upper limb 3-4-36

Note the center contact was uncertain from intervening branches. Distances between the Sun and moons nearest limb are as follows.

P M. { dis : ☉ & ☾ limbs }
At 3. 26'. 49'' 92° 34.00
3. 33. 43 92. 35. 55
3. 39. 56 92. 38. 25 } Index er : +13'. 47''. 5.
3. 42. 36 92. 39. 00
3. 46. 5 92. 40. 00
3. 50. 14 92. 41. 50

Triple contacts of the moons limbs and center.

At 4^h 1'. 11'' upper limb } ☾ ap : D : Alt : 62° 55'. 00
4. 3. 1 center }
4. 4. 52 lower limb } In : er :
At 4. 8. 55 upper limb } ☾ ap : Dble : Alt : 64° 37'. 45'' } +13'. 47''. 5.
4. 10. 41 center }
4. 12. 24 lower limb }

These contacts of the moon are not to be considered as so perfect as similar contacts of the Sun, on account of the pale light of her disk in the presence of the Sun, the illuminated part being also but a small proportion of the whole disk, the following mer : alt : of the moon taken in the evening was very correct . . . ☾ ap : mer : dble : alt : 89° 17'. 20'' In : er : +13'. 47''. 5, these were taken, because the ☾ moon's alt : could not be taken at the same instants with the distances between the Sun and moon's limbs

1804 }
November }

and may be used or not as a check
at the pleasure of the calculator.

Distances of the moons west
limb from α arietis

At 7 ^h 42'.57"	Distance 719 45'.00"	} In : er : - 13' 47 $\frac{1}{2}$ ".
7 .51 .27	71 .42 .15	
7 .59 .38	71 .38 .55	

Sunday 11th Thermometer 24° At the post of Washita
took the sun's ap : mer : dble : alt :
79° 12' 7" In : er : + 13'. 32".5
Lat : 32° 29' 30".5.

Set out at 3^h 54' from the post of Washita.

N 45 W 4.30 lost 2' ; per log 8 perches per $\frac{1}{2}$
minute.

N 30 W 4.55 to Baron Bastrop's plantation ;
encamped, made this afternoon 3
miles. The meridian observations
of this day and yesterday for the
Lat : being in my opinion both as
good as the instrument admits, I
take the mean of the two for the
truth, and as the distance of the
post from the place of observa-
tion is 450 feet North, I consider
the true latitude of the post as
fixed at 32 29' 37". 8.

Monday 12th Thermometer in air 36° in river water
54° clear, calm.

Sett off at 8.26 took in some fresh beef &c.

N 55 E 8.35 rate per log 8 perches.

N 8.39

N 60 W 9.15 lost 24' upon shoals.

N 10 W 9.20

N 25 E 9.40

N 9^h46' Bayu Siard on the right computed { 1804
2 leagues from the Fort. { November

N 70 W 10.15 river 100 yards wide.

N 30 W 10.23 at 10^h20' Bayu d'Arbonne, enter
a narrow passage to the left which
contains the whole river, being
shut up on the right except dur-
ing freshes: the course of the old
river upwards is east: and the
new channel with high banks is
from 30 to 40 yards wide.

N 30 E 10.25

N 60 E 10.31

E 10.33

S 45 E 10.45 at 10.39 return to the great river.

N 60 E 10.55

N 30 E 11.20

E 11.50 landed to observe ☉ mer: ap:
dble: alt: 78° 28' 52" In: er:
+13' 31" Latitude 32° 34' 47".

After dinner

set off at 1.48

Continued

E 1.53

N 2.00

N 70 W 2.10

N 2.15

N 40 E 3.3 at 2.30 a rapid — 2.45 another
rapid and shoal.

S 70 W 3.17 lost 5' upon a shoal.

Stoped untill 4.27 upon a shoal.

N 50 W 5.30 lost 25' encamped; thermometer
at 8^h p.m. 54° made this day 16
miles 32 perches.

1804 } Tuesday 13th Thermometer in air 33° in river water
November } 55° — fog — calm.

Set off at 6^h 51' per log 8 perches.

Continued

N 50 W 6.55

N 7. 2

E 7.23

N 45 E 7.40

N 45 W 7.44

S 85 W 8.00

S 55 W 8.40 lost 10'. at 8^h 10' an Island; at 8^h 12' a strong rapid landed to breakfast.

Set off at 9.42 9 computed leagues from the post: an Island on the right rocks called Roque rau.

N 9.46 rate per log 7 perches.

N 45 E 9.53 wind south.

N 45 W 10.31 river 150 yards wide — banks about 25 feet high.

N 11.10 lost 17' on shoals — at 11^h 3' gravelly rapids and a house on the right. Otter Bayou on the left at the end of the course: an Island at the mouth of the Bayou.

S 70 E 11.30 lost 12' the river has a more spacious appearance than below.

N 80 E 11.55 Two settlements at the end of the course on the right called 'Ecor aux Noyers' 30 feet bank, 4 feet clear at high water. Some Cypress grows along the bank.

N 30 E 12.10

N 70 E 12.30 at 12^h 26° a house on the right.

N 10 E 12^h36' a shower of rain — landed to dine. { 1804
Set off at 3.^o 3 Thermometer 66°. { November

Continued

N 10 E 3.17 rate per log 8 perches.

N 35 E 3.30

N 15 E 3.50

N 40 E 4.00 a 3.54 Bayu Bartelemi 12 computed leagues from the post.

N 55 W 4.11 rate per log 6½ perches.

S 75 W 4.25 lost 8'.

N 45 W 4.27

N 25 E 4.29

N 65 E 4.38

E 4.46

N 30 E 4.51

N 20 W 5.00

N 60 W 5.10 Bayou Pawpa.

N 20 W 5.20 encamped on the right, made this day 16 miles 312 perches. At 8^h p.m. Thermometer in air 62°.

Wednesday 14th Thermometer in air 44° in river water 55° clear, calm.

Set off at 7. 6 rate per log 5¼ perches.

N 20 W 7.24 Bayu Mercier on the left.

N 10 E 7.50 lost 2'.

*N 10 W 8.12 landed to repair the rudder irons &c to breakfast.

Set off 10.24

Continued

* On our return we landed 37 perches below the end of this course i. e. at 8^h 8½' on the 15th January 1805 and took the Sun's alt: to correct the time of the watch, at 10^h 56' 24'' a.m. ap: alt: ☉ l.l. 66° 36' 45'' In: er: + 12' 20''.

1804 } N 10 W 10^h 35' wind N.W.
 November } N 40 W 11.19 at 11.3 'Bayu Buttes' (mount
 Creek).

N 11.21

N 65 E 11.25 rate per log 6 perches.

N 11.30

N 70 W 11.40 landed to observe \odot ap: mer: dble:
 alt: $76^{\circ} 54' 35''$ In: er: + $13' 47''.5$. latitude found $32^{\circ} 50' 8''.5$.

After dinner

Set off at 1.40

Continued

S 70 W 1.47

N 80 E 2. 3

N 2.13

N 55 W 2.27

N 35 W 2.30 lost 8'; at 3^h 6' an Island begins,
 main channel on the left—qr. 3^h
 30' at 3^h 13' End of the Island
 and Bayu on the left.

N 10 W 3.40 rate per log 7 perches; low coun-
 try commences.

N 15 E 3.53

N 35 E 3.59

N 45 W 4. 4 river from 50 to 60 yards wide.

N 75 W 4. 7

N 4.15 small timber; overcup white oak
 along the banks subject to be
 overflowed.

N 35 E 4.19

N 4.22

S 70 W 4.26

N 60 W 4.28

N 4.29

N 50 E	4 ^h 33'	{ 1804 November
N 20 W	4.35	
N 45 W	4.39	
N	4.42	
N 45 E	4.44	
S 85 E	4.50	
N 15 E	4.53	
N 60 W	4.55	
N 80 W	4.58	
N 40 W	5. 2	
*N 40 E	5. 6	
N 80 E	5.10	Wind west — river 35 to 40 yards wide.

N 5.13

N 30 W 5.17 Encamped on the left, made this day 12 miles 303 perches.

Thursday 15th Thermometer in air 33° in river water 55° hoar frost—some clouds.

Set off at 9.14

Continued

N 30 W 9.35 rate per log 7½ per :

N 10 W 9.42

N 40 W 9.50

N 10. 3

N 50 W 10.10

S 70 W 10.24 lost 8'.

N 10.53 lost 5' a rapid.

N 70 E 11.00 Bank low overflows 20 feet perpendicular.

N 20 E 11. 4

N 20 W 11. 7

* On our return down the Washita, on the 14th January 1805 we observed an Eclipse of the moon at this place, from whence the longitude was deduced.

1804 } N 45 W 11.23'
 November } N 30 E 11.24 No more long moss (Tilansia)
 seen above this.
 N 45 E 11.35 at 11^h 33' 'Isle de Mallet'—
 landed to observe and placed the
 Instrument on the left shore 90
 yards higher than the point of
 the Island: ☉ ap: dble: mer:
 alt: 76° 5' 28" In: er: + 13'. 30"
 Latitude found 32° 59' 27".5.
 The division line between the
 Territory of Orleans and that of
 Louisiana will traverse the river
 32 1/4" of a degree north of the
 place of observation, and may be
 found at any time by following
 the above remarks respecting the
 situation of the N.E. end of the
 Island of Mallet.

Set off after

dinner at 1.28
 N 10 W 1.46
 N 35 E 1.55
 N 25 W 1.58
 N 30 W 2.10 rate per log 7 perches.
 N 80 W 2.17
 N 25 W 2.30
 N 2.35 }
 N 60 W 2.42 } 3 sand beaches ('les trois bat-
 N 10 W 2.51 } tures').
 W 3.13
 S 45 W 3.24 Thermometer 60°.
 W 3.33 rate per log 8 perches 'Bayu grand
 marais' on the left.

N 45 W	3.35'	} 1804 November
Stop	3.47	
N	3.57	
N 50 W	4. 5	
N	4. 7	
N 60 E	4.12	
N	4.15	
N 40 W	4.34	
N	4.42	Cypriere Chattelerau on the right — a point of high land approaches within half a mile of the river on the same side.

N 45 W	4.46	
S 80 W	4.56	
S 75 W	5. 2	
N 45 W	5. 5	Encamped on the left — Ther- mometer at 8 ^h p.m. 50° extremes 33°-60° made this day 16 miles 42 perches.

Friday 16th Thermometer in air 38° in river water 54°
— cloudy — calm.

Set out at 6.58

Continued

N 45 W	7.10	rate per log 7½ perches.
N 10 W	7.16	
N 45 W	7.23	
N 15 W	7.26	a Creek on the left.
N 5 E	7.35	
N 45 W	7.39	
— W	7.40	
S 70 W	7.43	
S 80 W	7.49	
N 45 W	7.51	
N 45 E	7.54	

1804 }
November }

N 65 E 7.58'
N 25 E 8. 2
N 10 W 8.10
N 45 E 8.22
N 8.27

Breakfast 9.35

Continued

N 9.42 rate per log $7\frac{1}{2}$ perches.

N 65 E 9.45

S 60 E 9.50

N 45 E 9.55

N 10. 8

N 20 E 10.18

N 20 W 10.24

N 45 W 10.37

N 10.40

E 10.53

N 30 E 10.56

N 15 W 11.10

N 50 W 11.19 on the right, 'marais de la Saline'
— a large lake and point of high
land about a mile distant — Tulip
creek on the right.

N 80 W 12. 2 lost 24'.

S 70 W 12.22

N 45 W 12.29

S 45 W 12.53 Great Saline Bayu on the right.

Dinner 2.34

Contd

S 45 W 2.39 rate per log $7\frac{1}{2}$ perches.

W 2.43

N 20 W 2.45

N 30 E 2.57

N 75 W 3. 4

S 80 W	3 ^h 24'	} 1804 November
S 25 E	3.34	
S 60 W	3.39	
	W 3.54	

N 20 E 4.00

N 45 E 4.14

N 20 W 4.23 the 3 pine trees.

N 55 W 4.46 lost 8'.

N 4.50

W 4.52

S 4.54 encamped: Thermometer at 8^h
p.m. 42° extremes 38° 51° made
this day 17 miles 185 perches.

Saturday 17th Thermometer in air 40° in river water
54° fog on the river, calm, river
rose 2½ inches in the night.

Set off at 7.19

Course continued

S 7.23 rate per log 6 perches.

S 75 E 7.27

N 7.40

W 7.42

S 45 W 7.55

N 45 W 8.00

N 20 E 8. 9

N 60 E 8.17

N 30 W 8.18

N 80 W 8.27

N 20 W 8.30

N 5 W 8.56

W 8.58 'marais de cannes' (cane marsh) on
the right.

Breakfast 10. 7

S 15 W 10.23 rate per log 7 perches.

1804 November	}	S 65	W10.42	long leaf-pine.
		N 45	W10.49	saw the first swan, shot by one of the hunters.
			W10.52	
		S 45	W11. 1	pirsimmons and small black grapes.
		N 45	W11.18	
		S 75	W11.25	small cane — Sun breaks out — serene.
		N 55	W11.30	no long moss (tilandsia) seen since we entered the low alluvial lands.
		N	11.42	landed to observe. ☉ mer : ap : dble: altitude $74^{\circ} 37' 52''$ In : er : + $13' 57''.5$ latitude $33^{\circ} 13' 16''.5$.
		Dinner	1.42	
		Continued		
		N	1.49	rate 8 perches.
		N 45 E	1.50	
		E	2. 5	
		N	2. 9	a rapid.
		W	2.21	canes pines.
		N 70 W	2.39	
		N 45 E	2.52	saw an alligator.
		N	3.10	
		N 80 W	3.30	the Eagle.
		S 45 E	3.31	
		S 30 E	3.48	lost 10'.
		S 15 W	3.52	
		S 70 W	3.57	
		N 80 W	4. 4	
		N 60 W	4.17	
		S 80 W	4.19	
		S 55 W	4.29	
		N 80 W	4.32	
		N 30 W	4.35	sand beaches.

N 4.47' { 1804
N 70 W 4.53 { November

W 5. 7 Thermometer at 8^h p.m. 44° extremes 40°-51° made this day 15 miles 308 perches.

Sunday 18th Thermometer in air 32° in river water 52° serene—calm,—river rises a little.

Set out at 7.20

Continued

W 7.23 rate per log 7½ perches.

S 20 W 7.34

S 80 W 7.49 lost 3' by the rapid, at 7.41 an Island and passage round to the right, the old channel shut up by a sand bar; the whole river runs through the narrow channel of about 70 feet wide.

N 10 E 8. 2

N 15 W 8. 6

N 40 W 8.20

S 80 W 8.23

S 35 W 8.27

S 10 W 8.40

N 80 W 8.48

S 25 W 8.51

S 45 E 9. 2

S 9. 7 'Cache la Tulipe' (Tulipe's hiding place).

Breakfast 10.11

Continued

S 10.22 rate per log 7½ perches.

W 10.34

N 20 E 10.40

N 15 W 10.44

1804 }
November }

N 40 W 10.52'

N 10 W 11. 7

W 11.13

S 25 W 11.20 lost 3' by a rapid.

S 60 W 11.25

N 80 W 11.30

N 50 W 11.41 landed to observe, ☉ ap: mer:
dble: alt: 74 1' 25" In: er: +13'.
50" latitude found 33° 17' 33".

Dinner 1.33

S 75 W 1.46 rate per log 7½ perches.

N 1.55

N 30 E 2. 9

N 2.14 Bay Morau — a large inlet on the
right, which swells into a consider-
able lake during an inundation.

N 80 W 2.26

South 2.43

S 45 W 2.46 large pine trees.

S 65 W 2.56

S 15 W 3.10

S 50 W 3.27 lost 14'.

S 75 W 4.19 hill on the left called ('Cote de
hachis').

S 55 W 4.30

S 85 W 4.32

N 30 W 4.34

N 4.39

N 35 W 4.41

N 60 W 4.44

S 30 W 4.52

S 70 W 4.57

N 70 W 5.00

N 40 W 5.02

N 5^h05' encamped Thermometer at 8^h { 1804
p.m. 57° in air, cloudy. made this { November
day 18 miles 75 perches.

Monday 19, Thermometer in air 54° in river wa-
ter 54° cloudy, calm, river at a
stand.

Set off at 6.56

Continued

N 7.00 rate per log 7½ perches.

N 60 W 7.15

N 35 W 7.18

S 15 W 7.23

S 70 W 7.24

N 70 W 7.26 Bayu de Hachis on the left.

N 30 W 7.31

N 70 W 7.40

N 52 W 7.49

N 7.52 points of high land touch the
river at various places — the val-
ley about a league broad on each
side.

N 70 E 7.58

N 47 E 8.17

N 8.25

W 8.26

S 55 W 8.37

N 80 W 8.40

N 50 W 8.45

N 50 E 8.52

N 30 E 8.53

Breakfast 10. 6

N 30 E 10.15

N 30 W 10.28

S 25 W 10.42

1804 }
November }

W 10.44'
N 58 W 10.46
N 15 W 10.53
N 40 W 11.08
W 11.10
S 25 W 11.26
S 10 E 11.29
S 35 E 11.34
S 50 W 11.38
W 11.48
N 20 W 11.53
N 60 W 11.58
N 40 W 12. 4
N 80 W 12. 8
S 60 W 12.16
S 40 W 12.22
S 55 W 12.32
S 45 W 1. 4 lost 20'.
N 65 W 1.11
N 1.30
Dinner 3.24 cloudy.
Continued

N 3.29
N 50 W 3.33
W 3.36
S 55 W 3.44
N 70 W 3.45
N 3.47
N 55 W 4.00
N 4. 7
N 60 W 4.15
N 20 W 4.20
N 25 E 4.30
N 80 W 4.34

S 80 W	4.42'	{ 1804 November
N 35 W	4.45 Cabane Champignole.	
N 60 W	4.52 rain.	
N 10 W	4.55 encamped, Thermometer at 8 ^h p.m. made this day 18 miles 120 perches.	

Tuesday 20th Thermometer in air 59° in river water
54° cloudy, calm.

Set off at	6.48
North	6.56 rate per log 7½ perches.
West	6.58
S 40 W	7. 4
S 60 W	7.17
N 55 W	7.30
N 20 W	7.39 a deep creek on the left called Chemin couvert.
N	7.48
N 50 W	7.52
S 75 W	7.56
S 10 W	8. 4
S 75 W	8.13 a rapid, and gravel beach, water 40 yards wide.
N 60 W	8.20
N 20 W	8.37 a narrow passage to the left 60 feet wide a small narrow Island.
N 45 W	8.44
N 25 W	8.50
N 25 E	9. 4
N 30 W	9.20 lost 10'.
N 55 W	9.32
Breakfast	10.50
S 80 W	11. 7 rate per log 7½ perches.
N 75 W	11.14
N 45 W	11.23

1804 November	}	S 80	W 11.27'	
		S 35	W 11.29	
		S 28	W 11.39	
		S 58	W 11.48	saw an alligator / they seldom go. farther north in this river.
		S 30	W 11.53	Timber — birch, maple, holly &c.
		S 75	W 12. 2	cloudy and uncertain, did not go ashore to observe.
		N 60	W 12. 4	
		N 20	W 12.15	
		N 25	E 12.22	
		S 75	E 12.32	
		N 40	E 12.36	
		N 10	W 12.50	
			W 12.54	
		S 80	W 1. 4	
		Dinner	3.00	Thermometer 62°
		N 10	E 3.16	ferruginous earth.
		N 45	W 3.18	
		S 50	W 3.31	
			W 3.36	
		N	3.38	
		N 50	E 3.44	
		N	3.50	
		N 45	W 3.56	
		N 75	W 4.00	
		S 70	W 4.10	
		S 50	W 4.32	lost 7'.
		S 85	W 5. 3	at 4.54 a hill of pines on the left; at 5 ^h an island; we passed through a small channel to the right. made this day 18 miles 308 perches, thermometer at 8 ^h p.m. 54° ex- tremes 59°-62°.

Wednesday 21st Thermometer in air 43°, in river water { 1804
54°, fog, calm. } November

Set off at 7^h 3'.

Course continued.

S 85 W 7.15 rate per log 7 perches.

N 35 W 7.17 Fin's hill a cliff 100 feet perpendicular.

N 7.44 lost 6' by a rapid.

N 25 W 7.52

N 10 W 7.57

N 25 E 8.19

N 35 W 8.29

W 8.32

S 8.35

S 40 E 8.43

S 55 W 8.53 river 80 to 90 yards wide.

S 85 W 9. 5

Breakfast 10.12 'Cote à Ross' (Ross' hill or camp).

N 10 E 10.20

N 45 W 10.26

S 75 W 10.32

N 45 W 10.35

N 15 W 10.47

N 45 E 10.55

S 45 E 11.11

N 45 W 11.20

N 10 W 11.26

N 35 E 11.34

N 11.46 landed to observe ☉ ap: mer:
dble: alt: 72° 14' 48" In: er: +13'.
51" Latitude found 33° 29' 29".

Dinner 1.30

N 55 W 1.39 rate 7 perches.

1804 }
November }

S	80	W	1.45'
N	75	W	1.51
N	60	W	1.55
N	85	W	1.59
S	45	W	2. 2
S			2. 4
S	40	E	2.12
S			2.15
S	40	W	2.25
N	80	W	2.33
S	80	W	2.47 lost 8'.
West			2.52 a creek to the left.
N	10	W	2.57
N	75	W	3.22 lost 7' thermometer 72°.
N	15	E	3.33
N	55	E	3.35
N	80	E	3.46
N	45	W	3.51
S	82	W	4. 3
N	60	W	4. 9
N	52	W	4.14
N	70	W	4.20 'Pointe-Coupée' (a cut off) old channel in a continuation with this course, the boat channel to the right.
N	50	E	4.24
N	68	E	4.28
N	35	E	4.33
N	58	E	4.40
N			4.43
N	43	W	4.48
N	15	W	4.51
N	30	E	5.00
N			5. 5

N 45 W 5^h 9' encamped on the right: made 18 { 1804
miles 36 perches: thermometer at { November
8 p.m. 58° extremes 43°-72°.

Thursday 22^d Thermometer in air 40° in river water
53° light clouds — calm. set off at
7.6.

S 62 W 7.15 rate per log 6½ perches.

W 7.20

N 53 W 7.36

N 32 E 7.42

N 7.51

N 45 W 7.58

N 20 W 8. 2

N 20 E 8. 9

N 25 W 8.12

N 55 W 8.18

W 8.31

N 45 W 8.33

N 20 W 8.41

N 40 W 8.45

N 8.53

N 45 W 8.58

Breakfast. 10. 7

S 80 W 10.16

N 85 W 10.21

S 70 W 10.25

S 10.33 at 10.28 the Cadaux or Cadodoquis
path crosses the river leading to
the Arcansas.

W 10.48 at 10.43 'Ecor à Fabri' (Fabri's
cliffs) 80 to 100 feet high lead said
to be buried on the ridge by Fabri
in the direction of the french and
spanish line.

1804 November	}	N 60	W 10.52'	
		N 40	W 10.55	
		N	10.59	.
		N 45	E 11. 8	lost 7' — 40 yards wide.
		S 80	E 10.20	
		N 45	E 11.21	
		N	11.23	
		N 30	W 11.25	
		N 70	W 11.31	
		N 25	W 11.33	
		N	11.36	
		N 65	E 11.41	
		N 20	E 11.43	
		N 10	W 11.45	
		N 45	W 11.56	cloudy, no observation.
		N 75	W 12. 2	
		S 85	W 12.17	lost 8'. at 12.15 'petit ecor à Fabri' (small cliff of Fabri)
		N 45	W 12.20	
		N 10	W 12.26	
		N 30	W 12.31	
		Dinner	2.34	
		N	2.37	
			E 2.44	
		S	2.45	a rapid.
		S 45	E 2.47	
			E 2.50	
		N 40	W 2.58	
		N 15	W 3. 8	
		N 45	W 3.10	
			W 3.13	river 30 yards wide only here, enclosed by bars &c.
		S 45	W 3.16	
		S 15	E 3.20	

S 45 W 3^h23' { 1804
W 3.27 { November

S 70 W 3.28

N 75 W 3.31

N 20 W 3.34

N 26 E 3.56 lost 9'.

N 60 E 4. 6

N 20 E 4. 8

N 5 W 4.11

N 50 W 4.15

W 4.18 rapids.

S 50 W 4.25 d.

N 60 W 4.53 lost 18' strong rapids and shoals.

N 10 E 5.00 encamped made this day 14 miles
317 perches thermometer at 8
p.m. 54 extremes 40° 68°.

Friday 23^d Thermometer in air 48° in river water 54°
light clouds — calm : river on the
fall.

Set off at 7. 4

N 15 W 7. 8 rate per log 6 perches.

W 7.11

N 55 W 7.13

N 25 W 7.15

N 10 W 7.34 lost 5'. rapids.

N 45 E 7.39

N 7.43

N 60 W 7.47

W 7.53

S 45 W 8. 2 lost 2'. rapids.

W 8. 5

N 60 W 8. 8

N 20 W 8.26 lost 2' on rapids.

N 45 W 8.28 lost 1'.

1804 } S 45 W 8^h 35'
 November } Breakfast 9.54 Drunkards Islands.
 N 45 W 10. 1
 N 15 E 10. 5
 N 25 E 10.12
 N 45 E 10.17
 N 45 W 10.25 lost 5'.
 S 10.37 lost 5'.
 N 45 W 10.54 lost 5'.
 N 85 W 11. 0
 N 45 W 11. 5
 N 10 E 11. 9 'Cote á Sofrion' (Sofrion's hill).
 N 15 W 11.15 banks from 9 to 12 feet high;
 yellowish clay.
 N 65 W 11.20 lost 4'.
 N 45 W 11.43 Landed to observe ☉ ap : dble :
 mer : alt 70° 59' 13" In : er + 14'
 8" Latitude found 33° 41' 35".
 Dinner 1.43
 N 45 E 1.51 'Pointe-Coupée,' old channel to
 the east.
 N 1.54 lost 2'.
 W 1.56
 S 70 W 1.58
 N 45 W 2. 6
 Lost 2.20 stop to cut willows.
 N 45 E 2.22
 N 15 W 2.30
 N 30 W 2.43
 N 10 E 2.50
 N 35 E 2.56
 N 60 E 3. 7
 N 3. 9
 N 45 W 3.12 Thermometer 72°.

N 80 W 3.17' { 1804
S 75 W 3.24 { November
S 35 W 3.37 lost 6'.
S 3.40
S 45 W 3.45
W 3.51
N 50 W 4. 2
N 50 E 4. 5
E 4.13
N 25 E 4.17
N 4.30 lost 2'.
N 45 E 4.33
N 4.38
N 75 W 4.46 rapids.
N 20 W 5.00
N 5. 5 Encamped. Made 13 miles 28
perches thermometer at 8^h p.m.
54°.

Saturday 24th Thermometer in air 48° in river water
54° light clouds — calm — river at
a stand.

Set off at 6.56

N 10 W 7. 4 rate per log 6 perches.
S 45 W 7. 8 Iron ore — black sand 'Auges
d'Arclon' (Arclon's troughs).
N 25 W 7.36 lost 22'.
N 60 E 7.53 river in general 80 Yards wide.
N 25 E 8. 3
N 70 E 8. 6
S 50 E 8.22 lost 3' — rocky bottom — strong
rapid.
N 40 E 8.30
N 8.39
Breakfast 9.49

1804 }
 November } N 35 W 10. 0'
 N 10. 3'
 N 40 E 10.56 lost 30' long and strong rapids.
 N 70 E 11.20 lost 18' ditto.
 E 11.27
 S 45 E 11.30
 S 15 E 11.39 lost 2'.
 S 45 E 11.48 lost 3'. a deserted corn patch.
 N 15 E 12. 8 cloudy, no observation.
 N 41 W 12.18 osiers or hoop willows.
 N 65 W 12.25
 W 12.34 Bayu Tallien on the left.
 N 60 W 1. 0 lost 5' on a rapid.
 N 55 W 1.14 Forks of the Washita and Little-
 Missouri, the latter coming in from
 the left in the direction of the last
 course.

Dinner 3.10
 N 20 W 3.20
 N 30 E 3.25 lost 3'.
 N 3.33 lost 5'.
 N 40 W 3.37
 N 60 W 3.41 lost 3'.
 N 45 W 3.46 lost 2'.
 N 20 W 3.51 lost 4' Petit-Washita on the left,
 runs into the Little Missouri.
 N 70 E 3.58 lost 1'.
 N 45 E 4.18 lost 9'.
 E 4.22 'Belle ance.'
 N 35 E 4.25
 N 30 W 4.47 lost 15'.
 N 25 E 4.54
 N 60 E 4.56
 S 85 E 5. 7 lost 5'.

N 60 E 5^h13' encamped — thermometer at 8^h { 1804
p.m. 59°. { November
made 11 miles 152 perches.

Sunday 25th confined all day to camp by the bad state of the weather, raining great part of the day. Extremes of the thermometer 54° to 70° and at 8^h p.m. 62°

Monday 26th Thermometer in air 50° in river water 57° — clear — calm — river risen 3½ inches during the night.

Set off at 7. 7

N 40 E 7.52 lost 30' rate per log 6½ perches.

N 8. 5 white maple.

N 45 W 8.13 lost 2'.

N 20 W 8.25 Bear's head camp.

N 60 W 8.30

N 80 W 8.38 cane land.

S 35 W 8.42

S 75 W 8.47

W 8.58 lost 2'.

N 30 W 9.11

N 35 E 9.15

Breakfast 10. 8

E 10.15 lost 8'.*

N 10.20

W 10.24

N 40 W 10.39 lost 6'.

N 10.50

N 80 E 10.53 lost 1'.

N 11.03

N 45 W 11.24 lost 2' — 'Petite-Cote' — an Island.

N 11.27

N 22 E 11.33

1804 } N 73 E 11.41'
 November } N 35 E 11.46
 N 85 E 11.50 landed to observe — ☉ ap: mer:
 dble: alt: 69° 23' 52". In: er:
 + 13' 38" Latitude found 33°
 54' 6".5.

Dinner 1.47

Continued

N 85 E 1.50
 N 38 E 1.57 lost 4'.
 N 20 E 2. 3
 N 85 W 2.15
 N 70 W 2.20
 N 45 W 2.29 many Islands.
 N 25 W 2.52 lost 16'.
 N 70 E 3. 0
 N 25 W 3.15 lost 9'.
 N 65 W 3.28
 N 50 W 3.33 at 3.31 'Bayu de Cypre' on the
 left. birch and osier.

N 3.40
 E 3.46 lost 5'.
 N 30 E 3.15 lost 4'.
 N 55 E 4.40 lost 38'. cut away some logs.
 N 20 W 4.47
 N 75 W 4.52
 S 65 W 4.55
 S 5. 1 Encamped — Thermometer at 8
 p.m. 62° — extremes 50°–68° made
 12 miles 21 perches.

Tuesday 27th Thermometer in air 54° — in river water
 58° — cloudy — river risen above
 a foot.

Set off at 7. 1

S 80 W	7 ^h 11'	rate per log 6½ perches.	{ 1804 November
N 70 W	7.17		
N 45 W	7.21		
N 10 W	7.33		
N 20 E	7.38	rapids commence.	
N 80 E	7.46	lost 6'.	
N 40 E	7.55		
N 30 W	8. 0		
N 70 W	8. 9	lost 7' Pirague à Gallien.	
S 70 W	8.15	lost 3' left the rapids.	
N 50 W	8.20		
N	8.33		
N 30 W	8.48		
Breakfast	9.51	river rises 1½ inch during the hour.	
	W 9.55		
S 30 W	10.10		
	W 10.13		
N 45 W	10.17		
N 10 W	10.30		
N 45 W	10.32		
S 70 W	10.36		
S 30 W	10.40	lost 2'.	
N 70 W	10.48		
N 40 W	10.52		
N	10.54		
N 45 E	11.12		
N 25 E	11.29	lost 8' a large Island to the left.	
N 40 E	11.30		
N	11.35		
N 45 E	11.42		
N 25 E	11.46		
N	11.52	cloudy — no observation.	
N 36 W	12.04	at 12 ^h 'Cache à Maçon' and bayu	

1804 }
November }

on the right: about $1\frac{1}{2}$ mile
N.N.W. explored the banks of
a creek in search of a coal mine
and found only some fragments
of carbonated wood; river risen
4 inches in 2 hours.

Dinner 2^h 15'
N 60 W 3. 0 rate per log $6\frac{1}{2}$ perches.
W 3.25 lost 17'.
N 45 W 3.34
N 3.40
N 45 W 4. 0 lost 6' river 150 yards wide.
N 70 W 4. 9
W 4.23 lost 7'.
N 70 W 4.32 lost 6'.
N 45 W 4.49
N 85 W 4.52
N 70 W 5. 0 encamped thermometer @ 8^h p.m.
66° extremes 54° - 71° made this
day 13 miles 39 perches.

Wednesday 28th Thermometer in air 68° — in river
water 60° — river fallen 4 inches in
the night — cloudy — calm.

Set off at 7. 5
S 65 W 7.13 rate per log $6\frac{1}{2}$ perches.
S 80 W 7.22
S 65 W 7.29 'Ecor aux poux de bois.'
N 60 W 7.37
N 7.42
N 35 E 8.16 lost 22'.
N 50 E 8.30
N 30 E 8.39
8.54 lost 10'.
N 8.57

Breakfast 10^h 3' beautiful pine woods on the right. { 1804
N 10.32 lost 14' — Bayu de l'eau froide on { November
the right, no cypress to be seen
about this creek on the margin of
the river.

W 10.36

S 45 W 10.42 lost 3'.

N 75 W 10.46

N 45 W 10.49

N 11.11 lost 11'.

N 40 W 11.15 lost 2'.

N 11.25 lost 5'.

N 75 W 11.30

S 70 W 11.46 lost 7'.

S 40 W 11.58

N 75 W 12. 2 cloudy no observation.

N 45 W 12. 7

N 25 W 12.20

N 40 W 12.30

N 25 W 12.57 lost 3'.

Dinner 3. 9

S 70 W 3.22 lost 4'.

N 70 W 3.25

N 40 W 3.42 lost 5'.

N 80 W 3.44

S 45 W 3.54 lost 3'.

W 4. 1

N 40 W 4.21 lost 7 — at 4.7 Grand glaise (Big
salt lick) on the left 2 miles dis-
tant Bayu de Cypre opposite in
the interior.

N 4.25

N 45 E 4.28

N 55 E 4.31

1804 }
November }

E 4^h34'—river 170 y^d wide.

S 75 E 4.44

E 4.54

N 45 E 4.58

N 10 E 5. 4

N 20 W 5. 8 Encamped. made 12 miles 255
perches. thermometer at 8^h p.m.
73°—extremes 68°–78°.

Thursday 29th Thermometer in air 72° in river water
62° — cloudy — wind south —
rain ; remained in camp untill after
dinner.

Got off at 1.27

N 85 W 1.34 rate per log 7 perches Saline Bayu ;
about half a league north a salt
spring.

N 65 W 1.58 lost 5'.

N 35 W 2.12

N 70 W 2.25

N 40 W 2.37

N 5 W 2.50

N 45 W 3.18 lost 11'. at 3^h 'Ecor à chicots.'

N 3.33 lost 3'.

N 80 E 3.45

S 60 E 3.46

S 30 E 3.57

S 45 E 4. 2 rapids.

S 85 E 4. 8

N 70 E 4.18 lost 3'.

N 30 E 4.22 lost 2'.

N 60 W 4.31 lost 6' rapids.

N 30 E 4.37

N 40 E 4.42

N 70 E 4.49

N 5^h 0' Encamped made 8 miles 2 perches. { 1804
thermometer at 8^h p.m. 52° ex- { November
tremes 52°-76°.

Friday 30th Thermometer in air 38° in river wat: 60°
— clear — calm — river risen 19
inches since last evening.

Set off at 7. 7

N 7.22 rate per log 6 perches.

N 80 W 7.25

S 45 W 7.30

S 30 W 7.46 lost 10' rapids.

S 60 W 7.49

N 75 W 7.53 lost 2'.

N 55 W 8.19 lost 6'.

N 15 W 8.26 lost 3'.

Breakfast 9.45

N 10 W 10.18 lost 6'.

N 10.27 'Fourche des Cadaux' on the left
100 yards wide — a hill 300 feet
high.

N 20 E 10.32

S 85 E 10.40

N 70 E 11. 5 lost 6'.

N 40 W 11.45 lost 21'. landed to observe, ☉ Ap:
mer: dble: alt: 67° 25' 30'' In:
er: + 13' 42'' latitude found 34°
11' 37'' —

Dinner 2. 0

N 15 E 2.15

N 50 E 2.18 'Bayu de Roches' on the left
(rocky Creek).

E 2.34

N 65 E 2.40

N 35 E 2.44 Encamped — Thermometer at 3^h

1804 }
November }

57° went to visit a saline. made
7 miles 28 perches.

December 1st

Saturday Thermometer in air 32° — river water 54°
— clear — calm — river fallen 18
inches during the night.

Set off at 7^h 5' 'Isle de roches' (rocky island) $\frac{3}{4}$
mile long on the right.

N 35 E 7.23 lost 10' — rate per log 6 perches.

N 75 E 7.31 lost 5'.

S 70 E 7.42 lost 6'.

N 65 E 7.52

N 45 E 8. 0

N 32 E 8.10

N 15 E 8.34 lost 13'.

Breakfast 10.12

N 55 E 10.18

S 80 E 11.10 lost 20'.

N 15 E 11.25 lost 11'.

N 10 W 12. 5 lost 35' on the rapids: no obser-
vation.

N 45 E 12.15 'Bayu de l'isle de Mellon' on
the right.

E 12.27

Dinner 2.29

E 2.44

S 45 E 2.53 lost 4'.

N 45 E 2.56

N 3.36 lost 11' at 3^h 30' a saline distant
2 miles to the left, and Isle de
mellon on the right.

N 10 W 4.37 lost 38' encamped — made 7 miles
148 perches — Thermometer at 8^h
p.m. 35° extremes 32°–58°.

Sunday 2^d. Thermometer in air 30° in river water 50° { 1804
clear — calm — river fallen 4 inch. { December

Set off at 7^h35'

N 10 W 7.44 rate per log 3 perches rapids commence.

N 45 E 7.50

N 75 E 7.55

S 30 E 8. 4

S 80 E 8.13

N 40 E 8.29

S 80 E 8.32

N 55 E 8.37

N 42 E 8.40 rapids end.

Breakfast 10.7

N 42 E 10.35 rate per log 5 perches.

N 28 E 10.51

N 15 E 10.58

N 8 W 11. 0

N 12 W 11.12

N 10 W 11.43 lost 15' rate per log 3 perches.

N 20 E 11.46 rate per log 5 perches.

Dinner 2. 3

N 20 E 2.30 at 2^h19' slate quarry on the left and a Creek.

N 55 E 2.23 'Isle de Chevreuil' (Deer island).

N 40 E 2.39 lost 3' — Free stone and blue slate to the left.

N 5 W 3.11 strong rapids rate per log 3 perches — Bayu de prairie de Champignole on the left.

N 32 E 3.28 Thermometer 59° —

N 45 E 3.46

S 85 E 3.51 lost 11', rate per log 5½ perches.

N 53 E 4. 7 Encamped: — made 6 miles 118

1804 }
December }

perches—Thermometer at 8^h p.m.
38° extremes 30°–59°.

Monday 3^d Thermometer in air 38° in river water 48°
—clear—calm—river fallen 8
inches.

set off at 7^h 12'

N 35 W 7.20 rate per log 5 perches.

N 20 W 7.31

N 10 E 8. 4 lost 8'.

N 30 W 8.26 'Bayu de l'eau froide' on the left.

N 30 E 8.45 lost 3'.

breakfast 9.50

S 70 E 10. 8 rapid; rate 3 perches:

N 75 E 10.20

N 10.40

N 10 E 11. 4 lost 18'. rate per log 6 perches.

S 15 E 11.28 rapids 3 perches per log.

E 11.40 rate per log 5 perches, landed to
observe ☉ ap: mer: dble alt: 66°
12' 00" In: er: + 13' 48".5 lati-
tude found 34° 21' 25".5.

Dinner 1.45

N 35 E 2. 6 rate per log 3 perches.

N 2.15 rate per log 5 perches.

N 25 E 2.42 lost 22'.

N 60 E 2.48 rate per log 3 perches.

N 40 E 2.53

N 10 W 3. 8 lost 5' rate per log 5 perches.

N 20 E 3.13

E 3.28 lost 13'.

N 45 E 3.32

N 80 E 3.35 rate per log 3 perches.

N 45 E 3.45 rate per log 4 perches.

N 4. 1 at 3.57 rock promontory, hard

flint, on the right with masses in the river. { 1804
December

N 30 W 4^h18' arrived at the 'Chuttes' passed over and encamped.
river 200 yards wide.
made 7 miles 218 perches —
Thermometer at 8^h p.m. 44° extremes 38°-59°

Tuesday 4th Thermometer in air 36° in river water 48° clear — calm — river fallen 2 inches.

set off at 7.21

N 45 W 7.34 rate per log 4 perches.

N 25 W 8.15 at 8^h passed a ledge of hard free stone rocks — rocky bottom, high rocky hill in front covered by pines a fine situation 350 feet high.

N 60 W 8.25

W 8.33

Breakfast 9.59

W 10. 9 rate per log 2 perches.

N 45 W 10.12 rate per log 4 perches.

N 20 W 10.15

N 20 E 10.24 at 10.20 bald hill on the left — arrive at the rapids.

N 50 E ½ mile: a very violent rapid.
landed to observe ☉ ap: mer:
dble alt: 65° 47' 4" In: er: +
13' 44" latitude found 34° 25' 48".

Dinner 1.45 rocky pine hill 300 feet high on the right.

N 20 W 1.52 rate 5 perches.

N 60 W 1.55

1804 }
December }

N 85 W 2^h 3' rate per log 6 perches : hills of blue slate (or shistus) to the left.

S 80 W 2.17

N 40 W 72 perches — violent rapid, long detention.

S 80 W 112 perches — encamped — 'Bayu de la Saline' on the right, made 4 miles 164 perches — Thermometer at 8^h p.m. 36° extremes 36° — 50°.

Wednesday 5th Thermometer in air 23° in river water 47° — serene — calm — river fallen 2 inches.

Set off at 7.25

S 70 W 8. 2 lost 25' — rocky hills on both sides — rate per log 5 perches.

S 55 W 30 perches — a violent rapid or cascade 4½ feet fall in 80 yards.

Breakfast 10.57

S 70 W 11.15 rate per log 6 perches.
W 11.20

N 50 W 11.29

N 40 W 144 perches, a strong rapid. — rocky hills on the right — high freshes 25 feet perpendicular above the present level of the river, at the end of this reach on the right a creek, called 'Fourche a Tigre' (Tiger Creek) good land upon this Creek.

Set off at 1.45

S 80 W 1.55 rate per log 4 perches.

Dinner 3.50

W 3.55

N 70 W 4.23' rate per log 3 perches.
 N 45 W ¼ mile.
 Set off at 4.54
 N 45 W 4.59 rate per log 3 perches.
 S 45 W 5. 1 Encamped made only 3 miles
 128 perches. Thermometer at 8^h
 p.m. 38° extremes 23°-56°
 Thursday 6^h Thermometer in air 45° in river water
 48° cloudy — wind S.W. light —
 river fallen 2 inches.
 Set off at 7.40
 S 45 W 7.52 rate 4 perches.
 S 30 W 8. 7 hills to the left, good land to the
 right.
 S 55 W 8.20 lost 4'.
 N 80 W 8.37 lost 12'.
 N 30 W 8.52 lost 2'.
 Breakfast
 N 20 W ½ a Mile : a great rapid, very pre-
 cipitous : 3 hours in getting over.
 Set off at 1. 8
 S 75 W 1.16 rate per log 5 perches, arrived at
 Ellis' camp a little below the
 'Fourche a Calfat', encamped
 made 2 miles and 32 perches,
 thermometer at 8^h p.m. 56° ex-
 tremes 45°-67°.
 S 25 W the course up the river, Calfat's
 mouth ½ a mile upon the left.

AT ELLIS CAMP.

Friday 7^h Thermometer in air 38° in river water 47°
 cloudy, wind N.W. river risen 4

1804 }
December }

inches. Took the Suns ap : mer :
dble alt: $64^{\circ} 59' 47''$ In : er : +
 $14' 5''$. latitude found $34^{\circ} 27' 31''$
Thermometer at 3^h p.m. 50° at 8^h
p.m. 24°

Saturday 8th At Ellis' Camp. Thermometer before
sunrise 10° — river water 43° —
very serene — light wind N.W.
river risen 4 inches. Took the
Sun's meridian ap : dbble alt 64°
 $46' 58''$ In : er : + $14' 19''$ latitude
found $34^{\circ} 27' 27''$ being a differ-
ence of $4''$ from the result of yes-
terday : if we should not make any
more observations here for the lati-
tude it may be considered as fixed
at $34^{\circ} 27' 29''$. Thermometer at 3^h
p.m. 47° at 8^h 26°

HOT SPRINGS.

Having determined to ascertain the latitude and longitude of this place with all due care and attention, the following series of observations was instituted for the latitude, using alternately the face of the Circle of reflection to the east and to the west, and reading off the angle from the three arms of the Index; but finding the Index error lyable to change daily, I found it preferable to calculate each days latitude independently by itself, to that of taking the means of several days altitudes, more especially as we were approaching the Solstice; but I have preserved the results of the same face of the Instrument as one series, and taken the mean of the two series for the true Latitude.

Face of the Circle to the East.

1804
December

Decr. 15th : Ap : mer :dble alt : ☉ lower limb. 1st Index 63-35'- 0'' In : er : +15'-48'' Latitude2^d Do 63-34-30 . . . 16-13

Means 63-34-45 . . . 16-0.5-34°30-56.''8

3^d Index under the handle could
not apply the Microscope.17th 1st Index 63-25-10 . . . 15-482^d Do 63-24-40 . . . 16-13

Means 63-24-55 . . . 16-0.5 34-30-58. 2

25th 1st Index 63-23-50 . . . 15-26.62^d Do 20 . . . 15-51.6

Means 63-23-35 . . . 15-39.1 34-30-58.75

27 1st Index 63-34-50 . . . 13-33.62^d Do 20 . . . 14-3.6

Means 63-34-35 . . . 13-48.6 34-30-54

Mean Latitude of the above 34-30-56.94

Face of the Circle to the West.

16th Ap : mer : dblealt : ☉ lower limb 1st Index 64° 1'-20'' In : er : -16'-11.2''2^d Do 37 42.23^d Do 20 12.2

Means 64-1-26 . . . 16-21.9 -34°31-4

24th 1st Index 63-51-50 . . . 15-41.42^d Do 52-20 . . . 16-13.43^d Do 51-50 . . . 15-48.4

Means 63-52-0 . . . 15-54.4 -34-31-0

26th 1st Index 63-58-30 . . . 15-28.52^d Do 59-00 . . . 15-48.53^d Do 58-32 . . . 15-28.5

Means 63-58-41 . . . 15-35.2 -34-31-4. 2

Mean Lat. from ye 24 series . . . 34-31-2.75

Mean Do from ye 1st do . . . 34-30-56.94

Cabin at the hot springs true Latitude . 34-30-59.82

Note the Index error was every day taken from a double contact of the Sun with his image immediately after the observation : When the error was additive

1804 } it was found by subtracting the \odot diameter from the
 December } greater contact and when subtractive the lesser contact was subtracted from the diameter, but in practice the greater or lesser contact was added to the ap : dble alt : to save trouble, as explained in the beginning.

Courses taken from the hill west of the hot springs on the 13th of December 1804 with computed distances.

1st Station.

N 54 E $\frac{1}{2}$ mile to the Cabin.

S 61 E 6 miles to the river Camp.

S 36 E 6 d^o to the mouth of Hot spring fork.

S 18 E 6 do to the mouth of Luke fork (west side of the river Washita.

S 10 W 9 do . . to . . do of Mont-cerne (west side) —

S 16 $\frac{1}{2}$ W 11 do to the top of Mont-cerne.

S 76 W 1 $\frac{1}{2}$ mile to the Source of the Hot spring creek.

S 76 E 3 miles to a hill in the fork of Calfat creek.

N 32 E Course of the ridge looking back.

S 60 W to 2^d station being about a mile in a direct line making a Cord to the arched form of the ridge. — Courses from 2^d Station.

S 11 W to Mount-Cerne.

N 64 W to the passage of the river between the hills about 12 miles distant.

S 3 W to the mouth of Bayu-Mont-cerne: $\frac{1}{2}$ mile S.E. a great rapid or Cascade below the mouth of Bayu Mont cerne.

S 48 E to the mouth of Hot-spring creek. { 1804
S 72 E to the River Camp. { December
N 50 miles, ridge of hills of the Arcansa.
S.E. 50 miles a level of great extent, supposed
to be the prairies of the Red-
river.

Sunday 16 Took the Sun's magnetic azimuth be-
fore and after noon with the same altitude.

A.m. at 9^h-50'-19" ☉ lower limb dble alt: 47°
30'.

p.m. time missed mag : az : S 42° 20' E
d° S 25° 40' W
difference 16-40
Var. E $\frac{1}{2}$ dif-8-20

Correction for change of declination. + .7"
Equal altitudes ☉ ap: dble alt: 54° 27' In: er: +
15' 46".

Contact upper limb at 10 ^h 18'-59"	} A.M.
Center 21-56	
lower limb 24-59	
lower limb at 1-42 -12	} P.M.
Center 1-45 -15	
upper limb 1-48 -12	

Took the following distances of the ☉'s east limb
from α Arietis.

		Times		Distances		Times		Distances		Times		Distances						
At	10h	31'	50"	55"	38'	20"	10h	39'	11"	55"	41'	20"	10h	47'	12"	55"	44'	50"
	10	33	57	55	39	10	10	41	53	55	42	40	10	50	12	55	45	55
	10	36	46	55	40	10	10	44	49	55	43	45	10	53	48	55	47	20
	Index error - 16' 16"																	

The above may be commodiously divided into 3
Sets or otherwise at the pleasure of the calculator.

1804
DecemberMonday 17th

Equal Altitudes

☉ ap: dble alt: 45° 49'. 0 "	In: err: + 15' 48"	{ Magnetic az: S 44° 30' E with the Sun's lower limb A.M.
Upper limb at 9 ^h 44'. 56" $\frac{1}{2}$	{ A.M.	
Center 9 . 47 . 13		
Lower limb 9 . 49 . 30	{ P.M.	
Lower limb 2 . 27 . 57 $\frac{1}{2}$		
Center 2 . 30 . 13		
Upper limb 2 . 32 . 31		

These equal altitudes together with those of the preceeding day will correct the watch and ascertain her rate of going, from which the apparent times of the Lunar distances will be precisely known.

Sunday 23

Equal Altitudes

☉ ap: dble alt: 43° 42' 25"		In: err: + 15' 27".
Upper limb at 10 ^h 8' 2"	} A.M. Watch supposed to have gained 45'.	
Center 10.10.13		
Lower limb 10.12.25		

The contacts P.M. lost by the intervention of clouds.

Altitudes of the Sun's lower limb with Magnet:
azim:

At 10^h 24' 12" Alt: 46° 31' 5" Azim: S 43° E.
10.28.57 47.35.40 S 42 E.

Ind: err: + 15.27.

Monday 24th

Equal Altitudes

☉ ap: dble alt:	43° 32' 47"	Ind: err: + 15' 41" 6	} A. M.
Upper limb at	10 ^b 12' 33 ½"		
Center	10 14 43		
Lower limb	10 16 55		

Clouds intervened in the afternoon

Wednesday 26th

Set the watch back one hour to correspond nearly with the present time, no alteration being made in minutes & seconds.

Equal Altitudes

\odot ap: dble alt: $32^{\circ}43'.25''$ Ind: err: $+15'27''$ { 1804
 Upper limb at $8^h40'.5\frac{1}{2}''$ } December
 Center $8.41.56\frac{1}{2}''$ } A.M.
 Lower limb $8.43.45$ }

Clouds intervened in the afternoon.

The last observations having been made when the Sun was barely clear of the vapor of the hot springs, I give the preference to the following observation made for the Correction of the Chronometer & for ascertaining the magnetic variation.

At $9^h6'50''$ ap: dble alt: \odot low: limb $39^{\circ}16'40''$
 Magnet: azim: S 49° E Ind: err: $+15'.27''$.

Lunar observations

on the astronomical 25^{th} Decem: took the following distances of the \odot and J 's limbs

Times	Distances	Dble alt \odot lowr. limb by Dor. Hunter
At $22^h5'.29''$	$58^{\circ}14'.0''$	In: er: $-15'27''$
22. 8. 5	$58.13.0$	
22.11.10	$58.12.0$ $53^{\circ}57'.30''$ Ind: err: $-1'22''.5$
22.19.0	$58.10.0$ $55.27.10$
22.22.5	$58.9.0$	
22.25.0	$58.8.0$	
22.39.7	$58.4.0$	
22.42.0	$58.3.0$	
22.44.35	$58.2.0$ $59.12.10$
22.48.40	$58.1.0$ $59.43.15$
22.54.37	$57.59.0$ $60.25.20$
22.57.47	$57.58.0$ $60.46.20$

Survey of the hot-spring Hill.

1st Station or place of Commencement on the west bank of the Creek opposite to the first or highest mass of Calcareous matter; Courses taken at this Station: N 40° E up the Valley adjoining the hot-spring hill; and N 15° W the course of the Creek upwards: Thence

1804 }
December }

S 20° E 18 perches to the bank of the Creek on the same side.

At 8 per : opposite to the middle of the Natural hot-bed over the Creek, a small hot-spring at its commencement. At 14 per : a hot-spring N° 3 opposite side of the Creek.

S 25 W 14 per : to the hot-spring N° 4 six feet to the left in the side of the bank of the Creek. At 2 per : hot-spring N° 1 opposite side of the Creek : at 12 per : hot-spring N° 2. over the Creek distant 4 perches.

S 3 E 34 per : nearly parallel to the Creek.
At 7 per : the Center of the Cabin on the right hand, and spring N° 5 in the gravel over the Creek : at 20 per : several small springs over the Creek : at 22 per : the lowest hot-spring N° 6. — All the forgoing Courses have been nearly parallel to the Creek, the continuation of which is S 13° E.

S 42 E 20 per : immediately cross the Creek, and at 4 per : the lowest calcareous mass.

N 60 E 106 per : At 60 per : the valley on the right distant 20 per :

S 66 E 30 per : to the Valley base of the hill : at 20 p. yellowish schistus.

N 60 E 60 per : N.E. corner of the base of the hill.

N 23 E 174 per : — 60 per : to the left the ridge is parallel to the Course.

N 16 E 70 per : to a rocky ridge perpendicular to the course and precipice looking

down into a branch of the Cafat run-
ning to the right; the Creek above
winds into the direction of the last
course, the ridge to the left divides
the Calfat from the hot-spring Creek.

N 44 W 30 per

S 84 W 72 per : to the top of a high ridge very
narrow, connected with the hot-spring
hill.

S 45 W 60 per : descending the Valley : The top
of the hill west of the Camp is in the
direction of the course : at right angles
on the left at the end of the course
 $\frac{1}{4}$ mile distant is a gap or low place
in the ridge contiguous to the hot-
spring hill.

S 31 W 80 per : down the valley — veins of the
flinty rock nearly in the direction of
the course and fissures at right an-
gles: Flint and hard siliceous stone
above, Schistus at the base — and
from thence to the place of begin-
ning nearly in the course of the Val-
ley.

Courses and distances from Hot-spring Camp to
the river Camp, commencing at the Cabin — Thence

S 15°E 788 per : — to the 1st. Knoll 122 p. — to
the 1st. branch 162 p. to the 2^d branch
282 p. — to 3^d d° 322 p. — to 4th d°
502 p. — to crossing of hot-spring
creek 614 per : and at the end of the
course a branch.

N 80 E 70 per : to the top of a ridge.

1804 } S 69 E 184 per: to the 2^d branch.
 December } S 25 E 160 per:
 S 68 E 80 p. to the Big lick.
 N 55 E 200 p. to the 2^d lick — at 160 p. 3^d
 branch.
 N 82 E 534 p. to the 5th branch — at 168 p. the
 4th branch.
 S 84 E 122 p. to the main Calfat — at 56 p. cross
 the last branch. the course of the
 Calfat is S 38° E.
 S 74 E 178 p. to the 3^d lick.
 S 54 E 304 p. to the river Camp. — at 94 p. a
 — branch.

1805 } 2620 perches, equal to 8 miles 60 perches.
 January } Saturday 5th At Ellis' Camp.

Equal Altitudes.

ap: dble Alt: 43° 18' 30".

Upper limb at	9 ^b 43' 10"	} A.M. Ind: err:
Center	9. 45. 12	
Lower limb	9. 47. 19	
Lower limb at	2. 59. 22	} P.M. Ind: err:
Center	3. 1. 27	
Upper limb	3. 3. 33	

+ 13' 15".
+ 13' 5".

As the same instrument was to be used for various purposes on the same day, the Index set for equal altitudes could not be screwed up untill the afternoon observation, and as the Index error was liable to change in the course of the day particularly when used much in the sun-shine, it is accordingly noted in the last example; the slight error it might occasion, would not materially affect the result.

Took the following alt: and azim: to ascertain the magnetic variation:

At 10^b 3' 42" a.m. ☉ ap: dble alt: low: limb

47° 21' 10" Magnet: Azim: S 46° Ind: err: + 13' 15" { 1805
January

At noon the ap: dble alt: ☉ low: limb was 65° 8' 40" Ind: err: + 13' 9".

Lat: deduced 34° 27' 28".8 which is within 0".2 of the mean of the former two observations.

Distances taken between the ☉ and ☽ limbs

At 2^h 22' 45" Distance 54° 1' 0" Ind: err: + 13' 5"

2. 25. 50 . . . 54. 2. 0

2. 28. 45 . . . 54. 3. 0

Distances taken of the ☽'s west limb from Aldebaran

At 7^h 1'. 56" Distance 84° 52'. 0" In: er: + 13' 5" Alt: dble ☽'s low: limb 64° 17' 30"

7. 4. 0 84. 51. 0
7. 6. 6 84. 50. 0

In: er: — 1.20
by Dr. Hunter

January 14th Monday. At a point which we passed in ascending Nov: 14th — N 40° E 5^h 6'. observed an Eclipse of the Moon.

At 12^h 40' p: watch. Beginning of the Eclipse — uncertain.

13.37 Beginning of total darkness
— good observation.

Took the following altitudes of the Sun to correct the Chronometer and ascertain the apparent time of the Eclipse.

15th Tuesday

At a point on the river bank which corresponds to the Courses and distances of our voyage upwards viz Nov: 14th N 10° W 8^h 8½'; took the Sun's alt. viz at 10^h 56' 24". ap: dble alt low: limb 66° 36' 45" Ind: err: + 12' 20".

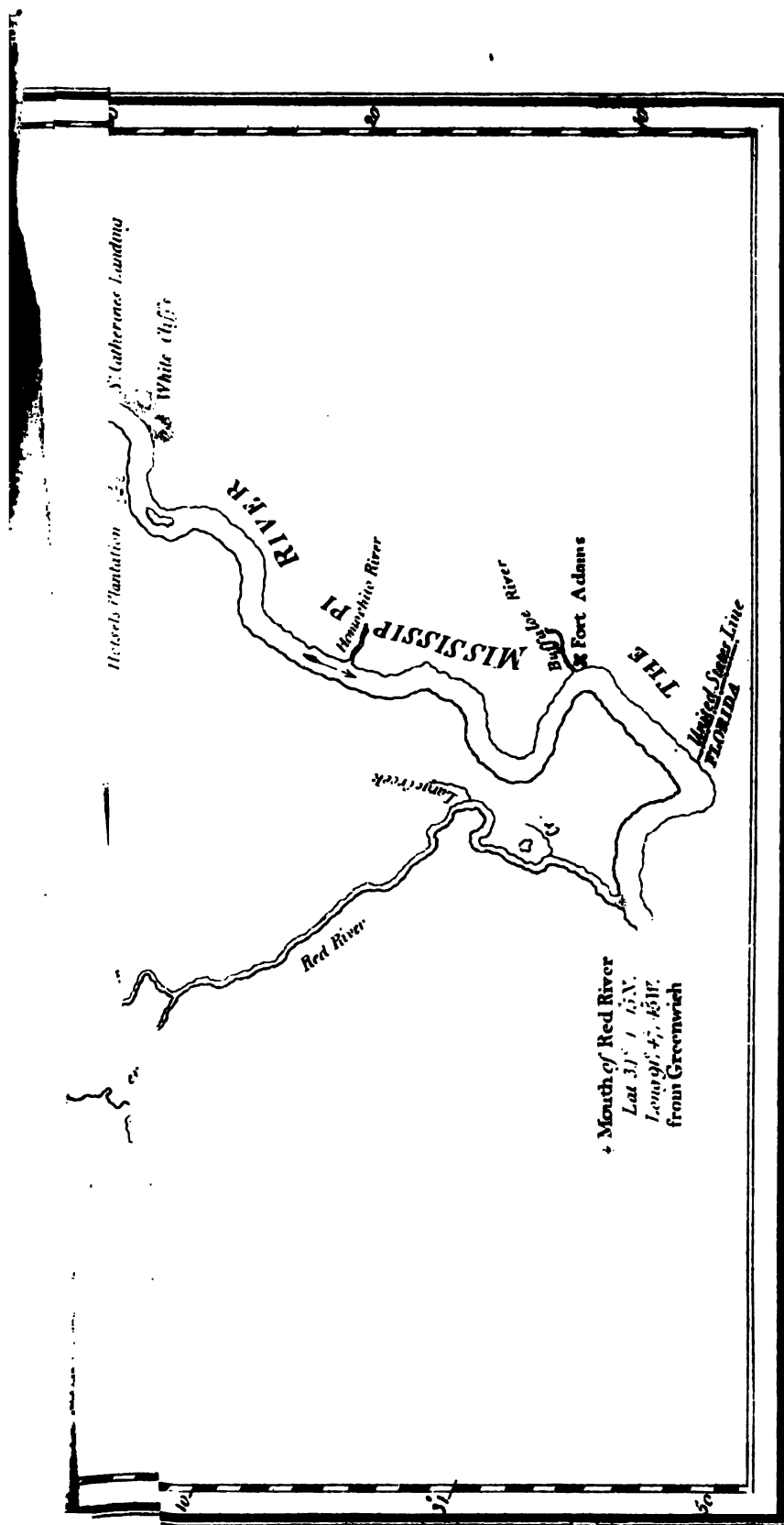
Thursday 17th

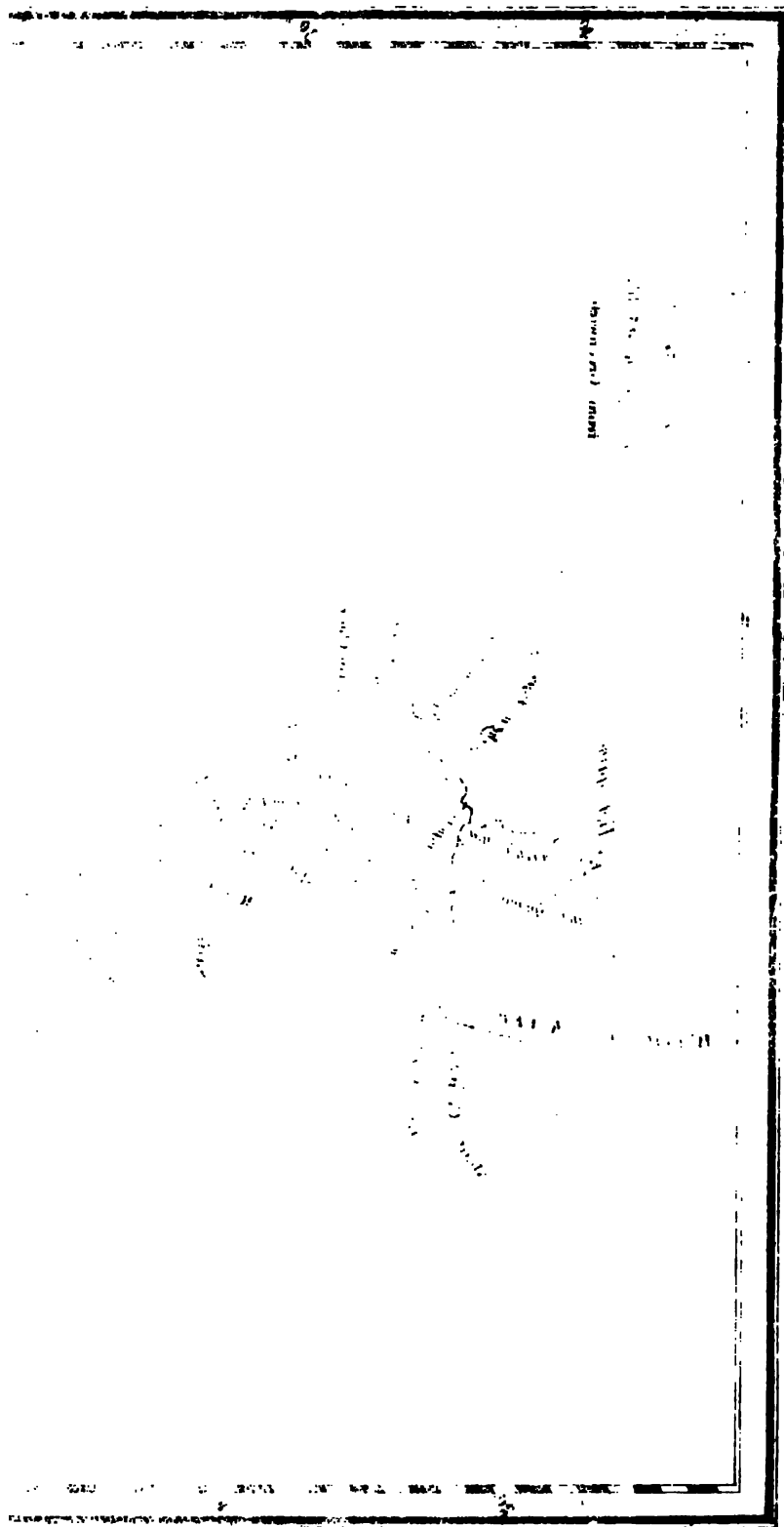
At the Post of Washita, the same station where

1805 } we observed on our way up, Took the Sun's altitude
January } viz :

At $8^h 53' 7''$ ap: dble alt: \odot low. limb $36^\circ 44' 45''$
In : er : + $12' 30''$.

From the above observations the apparent time of
the Eclipse may be found & the whole referred to the
Meridian of the Post of the Washita.





The Riverside Press : Cambridge



Purchase
&
Exploration
OF
Louisiana
1804

JAMES DUNN
M.D.

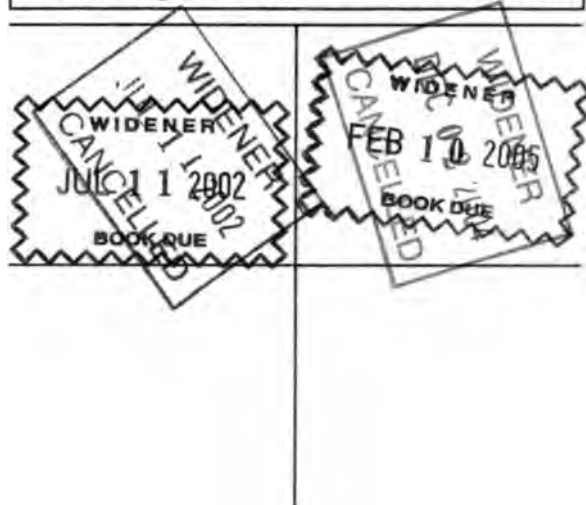




The borrower must return this item on or before the last date stamped below. If another user places a recall for this item, the borrower will be notified of the need for an earlier return.

*Non-receipt of overdue notices does **not** exempt the borrower from overdue fines.*

Harvard College Widener Library
Cambridge, MA 02138 617-495-2413



Please handle with care.
Thank you for helping to preserve
library collections at Harvard.

